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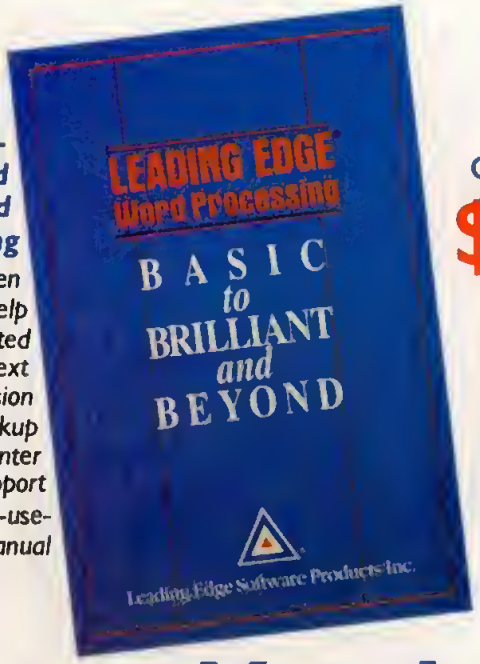

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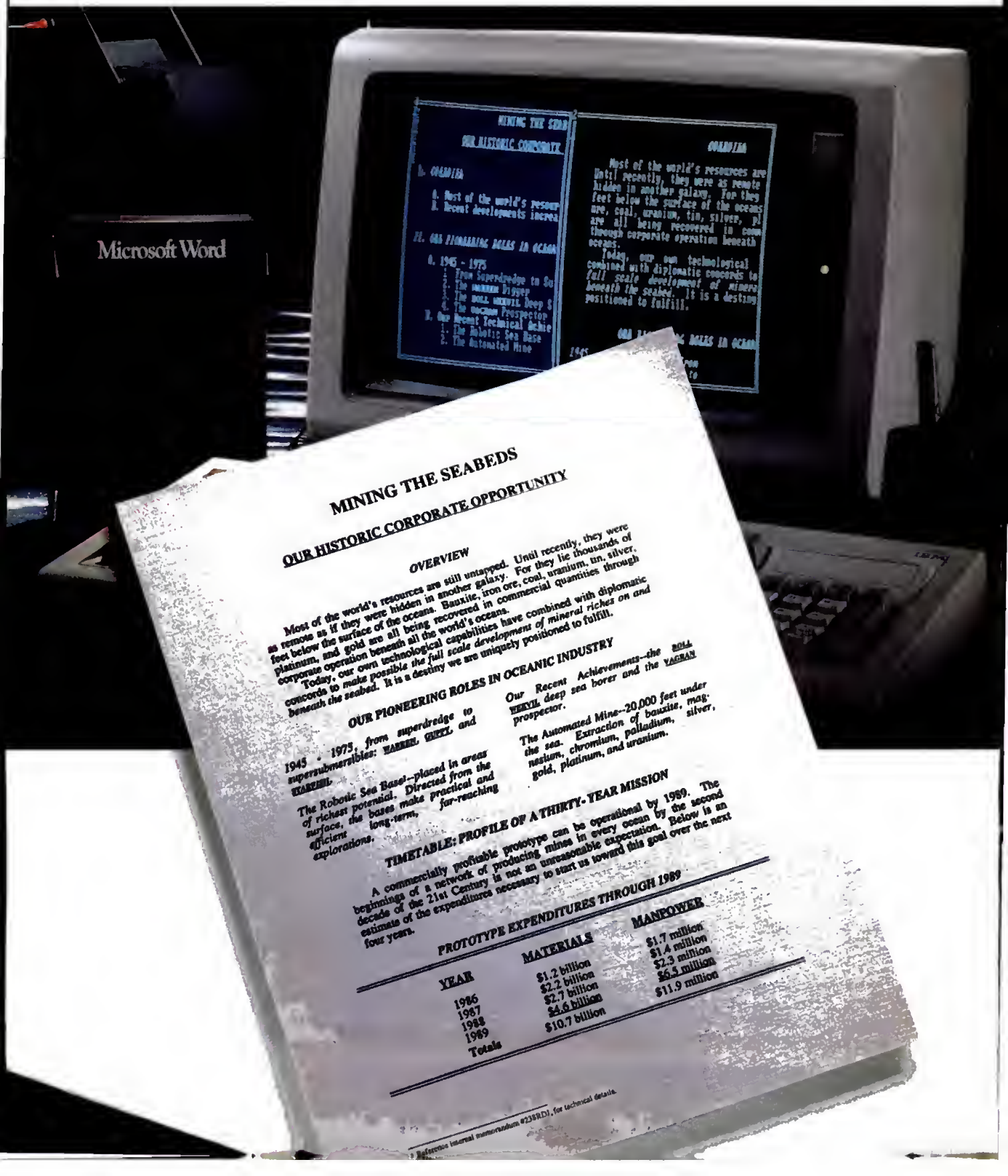

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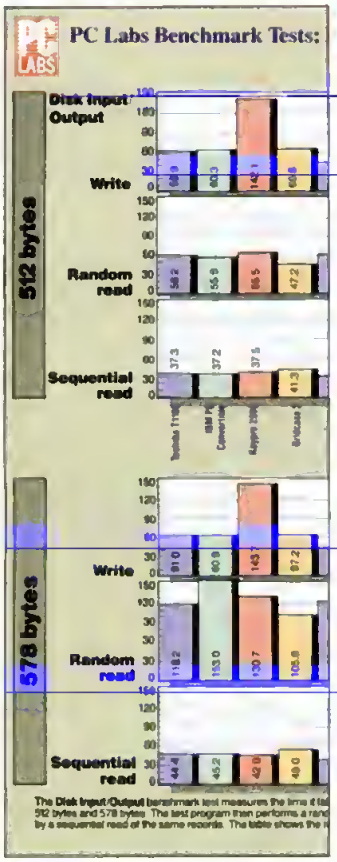

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DOS to Travel
Bill Machrone/Increasingly, business users are finding that they need real PC power—DOS power—on the road as well as in the office. Notebook computers like the popular Tandy Model 100, ideal for light word processing and other limited applications, don't begin to pack the power of desktop machines. And although the nine portables tested and reviewed here start to address the problem, none of them goes far enough to meet everyone's need for portable power. Take a look at how this group fared on PC Labs benchmark tests. IBM's brand-new PC Convertible, Toshiba's lightweight T1100, the Panasonic Exec. Partner, Quadram's Datavue 25, the Gridcase 3, Zenith's Z-170 PC, Sharp's PC-7000, the Compaq Portable II, and the Kaypro 2000..... 108

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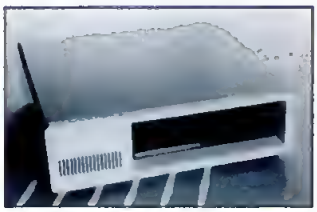

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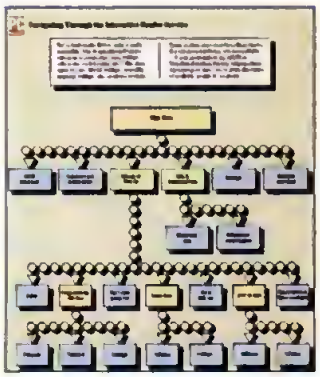

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WHAT'S INSIDE

For the last 18 months, scores of industry insiders have been burning up our phone lines with exclusive tips that the release of IBM's laptop was imminent. When the calls first started coming in, we would mobilize teams of reviewers and PC Magazine Labs testers and revise our hectic travel plans. So when a new flurry of such tips arrived just as a team of editors was preparing for a swing west, only senior editor Bill Howard (pictured above) reluctantly agreed to stay home just in case these leads actually panned out.

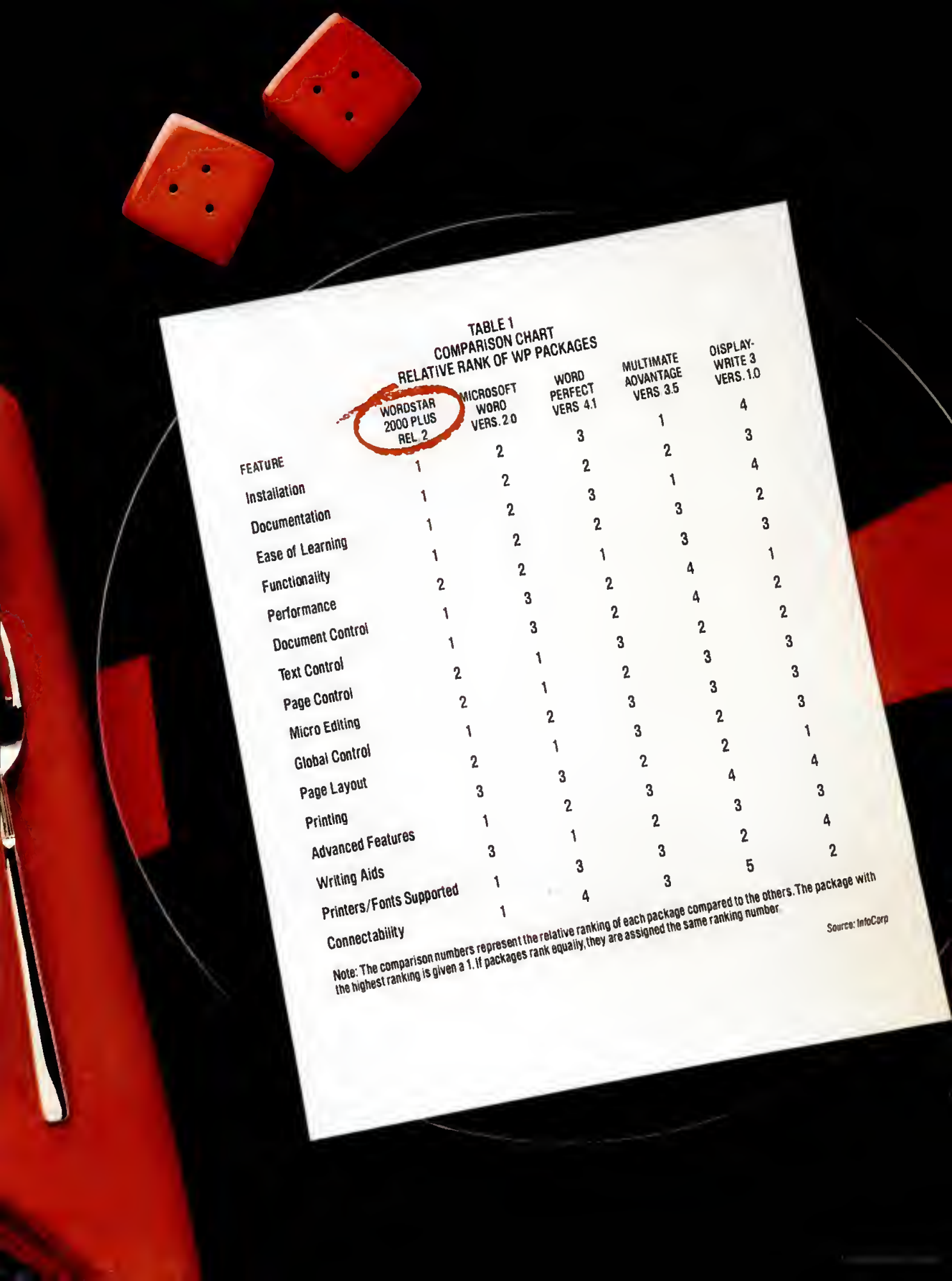
When the news of the IBM PC Convertible's release reached the West Coast, we quickly called Howard to ask if we should take the next flight back. His reply: "Don't bother."

The Convertible disappointed even the most diehard IBM fans. Its size and weight hamper its portability. In a world of fast AT performance, the Convertible plods along. Its screen, rumored to be state of the art, isn't. Expansion is awkward at best. Twin 3½-inch floppy disk drives—and the best keyboard we've seen—fail to compensate for IBM's "me-too" portable.

Clearly, IBM wasn't going to have the lightweight portable market all to itself; its Convertible is part of a much larger phenomenon. While the world was waiting for IBM's entry, other manufacturers were stamping out their own versions of DOS-to-go. Some, like the Toshiba T1100, have far better overall design. The Panasonic Exec. Partner FT-70, Quadram's yellow gaslit Datavue 25, and the awesome Gridcase 3 boast clearly superior displays. The new Compaq Portable II offers big-machine power in a surprisingly slimmed-down package. And Zenith has made impressive strides toward respectability by snaring several large government contracts with the Z-170 PC—its workmanlike Morrow Pivot spin-off.

Most of the computers reviewed in this issue's cover story (page 108) are based on yesterday's technology, but several new-generation machines have suddenly appeared. One, the 15-pound Toshiba T3100, an 80286-based portable equipped with a 10-megabyte hard disk drive and a plasma display, packing true AT speed and power, is the subject of a First Look on page 33 by portables expert Howard.

PC Magazine Labs also examines combined hard disk/tape backup units. Contributing editor Winn Rosch sums them up in "Tape and Disk: Storage with a Safety Net," page 143. Project Database II continues (page 187) with an installment on flat-file products, which, we discovered, are more capable than most people think. And our Programming/Utilities column gives you a free PC upgrade: on-screen status indicators for toggle keys.



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Text Control	1	3	2	4	2
Page Control	2	1	3	2	2
Micro Editing	2	1	2	3	3
Global Control	1	2	3	3	3
Page Layout	2	1	3	2	3
Printing	3	3	2	2	1
Advanced Features	1	2	3	4	4
Writing Aids	3	1	2	3	3
Printers/Fonts Supported	1	3	3	2	4
Connectability	1	4	3	5	2

Note: The comparison numbers represent the relative ranking of each package compared to the others. The package with the highest ranking is given a 1. If packages rank equally, they are assigned the same ranking number.

Source: InfoCorp

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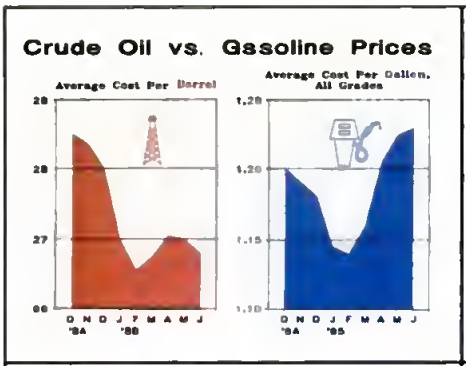
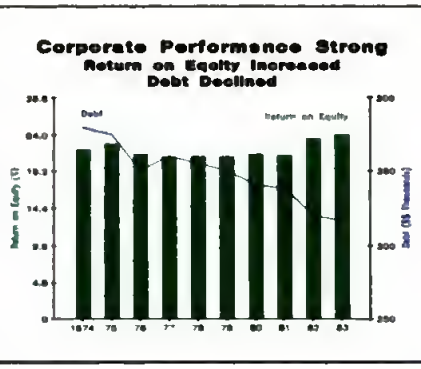
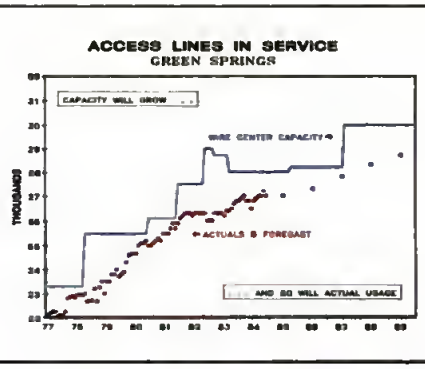
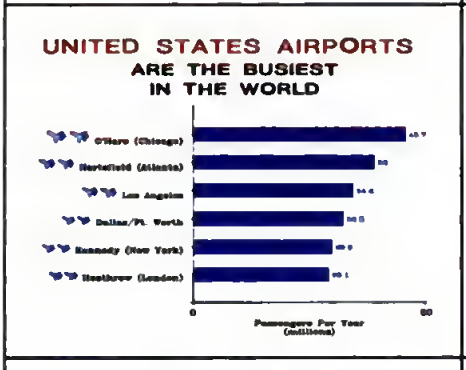
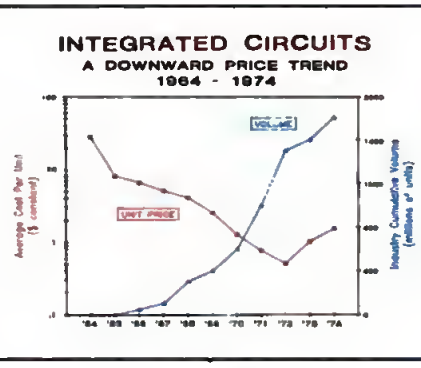
CIRCLE 231 ON READER SERVICE CARD

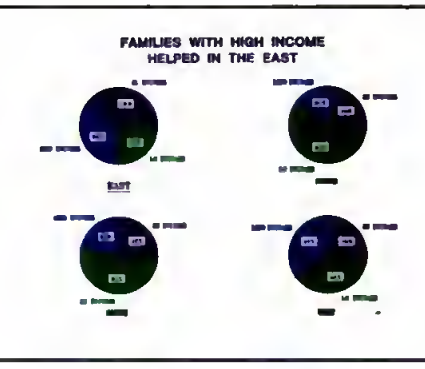


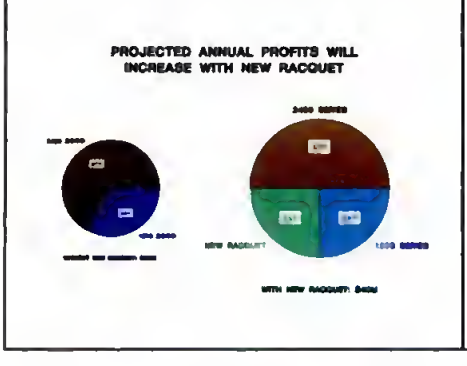


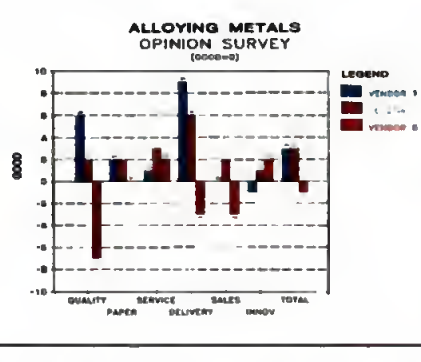


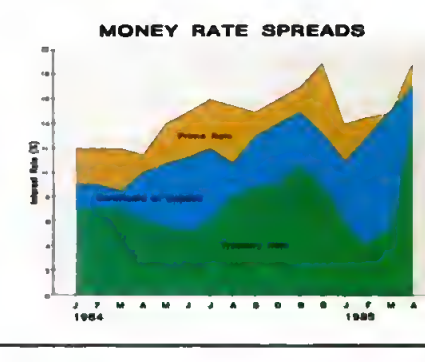












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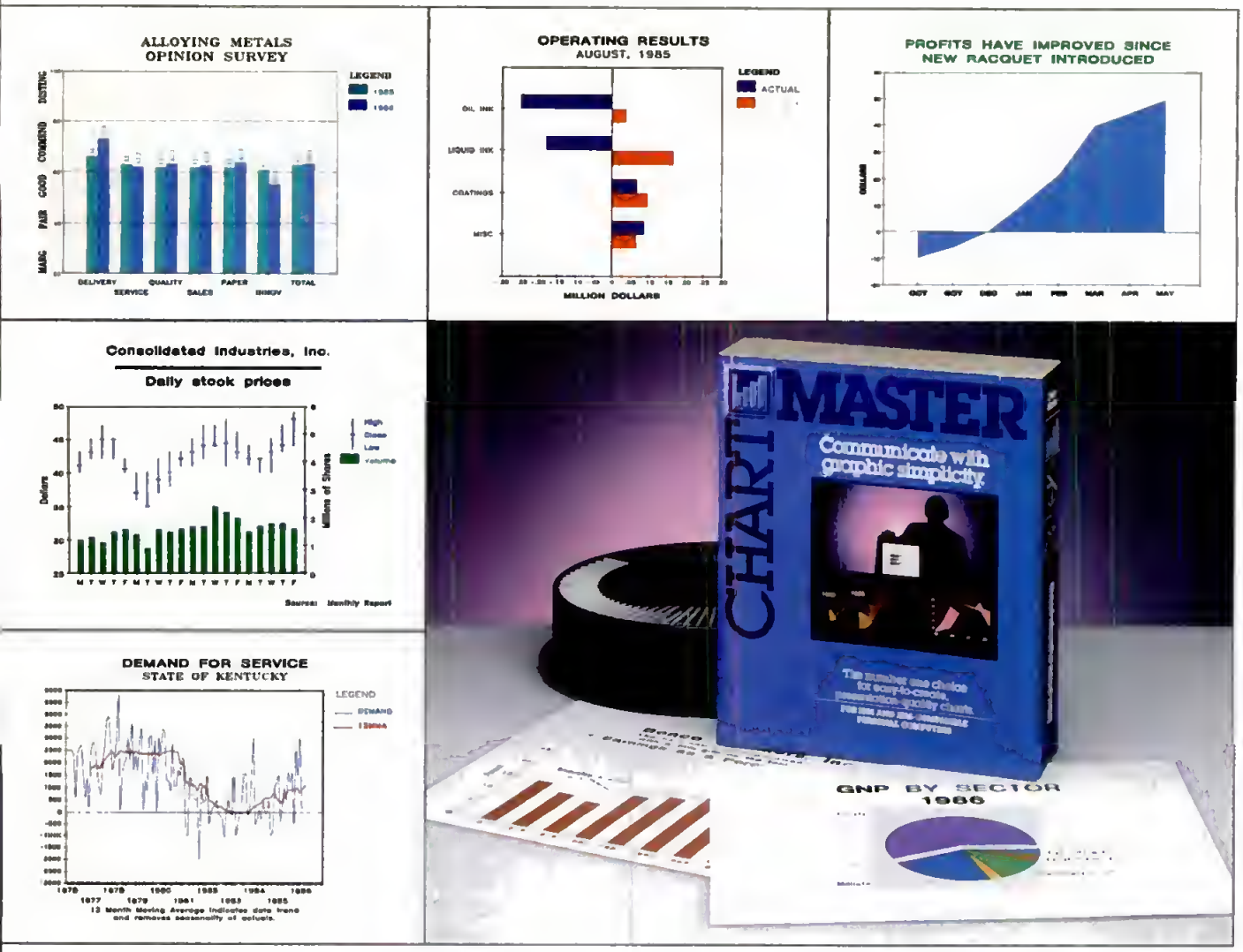

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CIRCLE 508 ON READER SERVICE CARD

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CIRCLE 364 ON READER SERVICE CARD

LETTERS TO PC MAGAZINE

The following letters are representative of the many we have received about the PC AT. They echo some of our negative experiences with the disk drives.—Ed.

TALES OF IBM ENCOUNTERS

It's about time somebody stuck a pin in IBM's balloon. I'd begun to think everyone was an apologist for IBM. But Paul Somerson's sidebar "How Much Is That Logo in the Corner?" ("Courting Disaster: The IBM PC AT," *PC Magazine*, Volume 5 Number 8) spoiled it all. I marvel at Mr. Somerson's equanimity in the face of disaster. He is truly a used-car salesman's dream come true, naive beyond belief. If his experience hasn't taught him that he's been unmercifully rooked, I can't imagine what will.

As a result of exposé articles in *PC Magazine* and elsewhere, we can hope the general public will be spared the needless headache of bitter firsthand experience and will be prompted to investigate the countless quality altematives to IBM, such as Compaq, Kaypro, Beltron, and Leading Edge.

Let's leave Mr. Somerson mesmerized and unperturbed by reality: smiling as his data vaporizes, affably watching his replacement drives crunch, and dutifully saving up his lunch money to pay for whatever marvel IBM proposes to sell him next.

Sally Ann Zegarelli
Long Branch, New Jersey

We have had problems with all three of our ATs. We replaced the hard disk on one of the units four times, the controller card twice, and the motherboard once. But your article, "Courting Disaster: The IBM PC AT" (*PC Magazine*, Volume 5 Number

8), was misleading. You made it sound as if IBM is the only vendor with disk problems. 'Tain't so.

None of our personal computer systems, including Compaqs, Tls, and IBM PCs, XTs, and ATs, and even our old CP/M CompuStar systems, has had a perfect record. And other computer systems fail, too. Our minicomputers have hard disk failures on an average of once every 4 to 6 months. Even mainframes go down.

If you're wondering who "we" are, "we" are the User Assistance Branch of the IRS and are responsible for supporting IRS micro and minicomputer users all over the United States. (This is not an official IRS communication.)

Amy J. Goebel
Alexandria, Virginia

The following is a copy of a letter sent to Robb Wilson, head of IBM's Entry Systems division.—Ed.

Dear Mr. Wilson:

As a True Blue IBM devotee, I am appalled at IBM's handling of the IBM AT hard-disk problem. Your reply to Bill Machrone's letter in *PC Magazine* did little to calm my anxieties.

I operate a number of IBM PCs, XTs, and ATs on an IBM network. And I can safely say that the AT hard disk from CMI was a major boondoggle that rivals, if not surpasses, the field problems encountered with IBM's ill-fated serics III copier. I could fill a volume with the problems that we have encountered with these drives. Regretfully, I do not know of a single multi-AT user who has not experienced problems with the CMI drives. And I have quickly learned that repairing these drives results in throwing good money after bad.

What shocks me most is IBM's pseudo-denial of the problem and the apparent lack of concem for customers who have been eating these lemons.

I have one question to add to Mr. Machrone's list: "Why hasn't IBM made some type of offer to existing CMI owners to rectify the problem and improve customer relations?" Why doesn't IBM offer to exchange a new Seagate, Tandon, etc., drive for the CMI drive at a cost of, say, $500? I, and most people I know, would jump at such an offer to obtain a drive that would live up to IBM's reputation for reliability.

In summary, I'm still a devoted fan of IBM products. But I am disgruntled with IBM's handling and lack of acknowledgment of the CMI hard disk problem. I believe that AT owners feel that they have been left holding the bag on CMI drives, and it is perceptions such as these that will eventually drive faithful IBM owners to alternative products.

James B. Stack
Kalispell, Montana

IBM RESPONDS TO PC MAGAZINE

Your recent articles on the IBM Personal Computer AT contained several misleading assertions.

Your startling declaration that all IBM PC AT fixed disk drives will probably fail is journalistically irresponsible and is not supported by the facts. To needlessly

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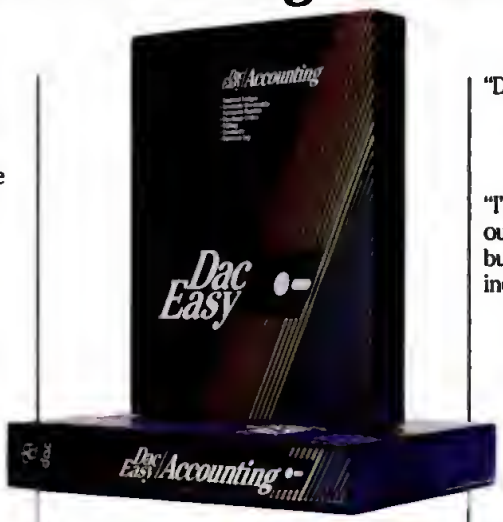

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CIRCLE 149 ON READER SERVICE CARD

■ LETTERS

alarm AT owners is a disservice to them and to IBM.

To underscore our position on the AT:

■ IBM wants 100 percent customer satisfaction with the AT, as with any other IBM product. If a customer is experiencing difficulties with the AT, we'd like to know about it so that we may take the necessary corrective action;

■ The overwhelming majority of ATs are performing well, a fact supported by our warranty claim data as well as customer-opinion surveys; and

■ IBM has consistently acknowledged receiving some reports of problems with the AT's fixed drive, contrary to the impression left by your series of articles.

What hurt the most were your statements that IBM doesn't care about its customers. We do care about our customers. In fact, a number of IBM PC AT users in your article cited IBM's commitment to excellence. Our actions—such as our dual card replacement program last summer for a small percentage of ATs—prove we care, and our customers know it.

Furthermore, disparaging statements by competitors who sell their own add-on disk drives are clearly self-serving and should be taken in that light.

James C. Reilly
IBM
Entry Systems Division
Boca Raton, Florida

In our ongoing conversations with corporate users, software developers, and user groups, we are hard-pressed to find an AT that hasn't failed. We didn't say that IBM doesn't care about its customers; some of your customers did. If there weren't a need for replacement AT drives, there wouldn't be such an active market.—Ed.

LOW-COST PC AT CLONES

Thank you for your article "Power Computing: Alternatives to the IBM PC AT" (Volume 5 Number 8). In fact, the entire issue was the best so far. However, except for the PC's Limited AT, you covered mostly AT clones costing over $3,500.

In the past few months, several very inexpensive, attractive alternatives have emerged, including the STD-AT by Standard Brand Products, the Adept DC-286 by Mainstreet Computer Corp., and the AMT-286 by American Micro Technologies. Some of these even include a 20-megabyte hard drive for this price, which is a significant price improvement over even the PC's Limited AT.

Please consider doing an update on this subject soon.

Wendell Brown
Seattle, Washington

You have a good point. And, in fact, we are planning an article on low-cost ATs, including some of the ones you mentioned, that can be purchased by mail order. Look for it in an early fall issue.—Ed.

WORDMARC MAKES A CHANGE

Our company makes *WordMARC*, the word processor with the altered keyboard that was used as the example that violated many sacred rules in Paul Somerson's editorial "Substandard Brands," in *PC Magazine* (Volume 5 Number 1). Our objective in laying out the keyboard was to maximize the number of function keys used and to place complementary functions close together, making its use intuitive for touch typing. The final design was a compromise between what our customer base had been used to on minicomputers and mainframes and what the new PC keyboard had to offer.

Mr. Somerson's argument for standardization is not without merit. Taking note of it, we have used the IBM PC keyboard positions for the Home, PgUp, and PgDn keys in our next release. At the same time, we will continue to emphasize the flexibility of software by allowing the user to reconfigure the keyboard to his or her own taste.

Pedro V. Marcal
President
MARC Software International Inc.
Palo Alto, California

CORRECTIONS

The article "DOS Tips, Tricks, and Techniques," which appeared in PC Lab Notes (*PC Magazine*, Volume 5 Number 6), included a listing for *Fancy Font 2.2* by SoftCraft Inc. An incorrect address was listed for the company. The correct address is 222 State St., Madison, WI 53703.

In "Getting the Most Out of Your Hard Disk" (*PC Magazine*, Volume 5 Number 5), Stephen R. Davis tested Personal Computer Support Group's *Lightning* disk cache product under PC-DOS 2.1 and 3.0 to ensure compatibility with both versions. To test compatibility with MS-DOS, he attempted to install *Lightning* on a Zenith Z-150 using MS-DOS 2.11. Since *Lightning* immediately crashed under this configuration, he (incorrectly) assumed that it was not compatible with MS-DOS. In fact, *Lightning* is not compatible with Zenith Z-150s nor Leading Edge Model Ds.

In addition, in response to the review, Personal Computer Support Group has improved the caching algorithm in *Lightning* to address the problem of large files flushing the cache.

A layout error reversed the left-hand columns for PUSHDIR.BAS and POPDIR.BAS in Volume 5 Number 10 (Figures 3 and 4, pages 246–247). (You'll see this if you compare the figure captions with the titles of the programs (line 100)). PUSHDIR.BAS should have 91 lines (see line 140) of DATA statements (290 through 1190); POPDIR.BAS should have 83 (290 through 1110).

Once you transpose the two left-hand columns, keeping the line numbering the same, the program code is correct. In both programs the DATA statements in lines 380 through 860 contain only zeros.

In other words, use lines 100 through 610 of the left column on page 246 in place of the entire left column on page 247 (Figure 4). Then use lines 100 through 640 of the figure on page 247 in place of the corresponding line numbers on page 246 (Figure 3). Sorry!

HOW TO WRITE TO PC MAGAZINE

Do you have a comment, compliment, or criticism about something you've read in *PC Magazine*? A question you'd like to open up to other readers? Then send your opinion on paper or disk to Letters to PC Magazine, One Park Avenue, New York, NY 10016, or send your opinion through MCI Mail to PCMAGAZINE at address 157-9301. We're sorry we're not able to answer letters personally.

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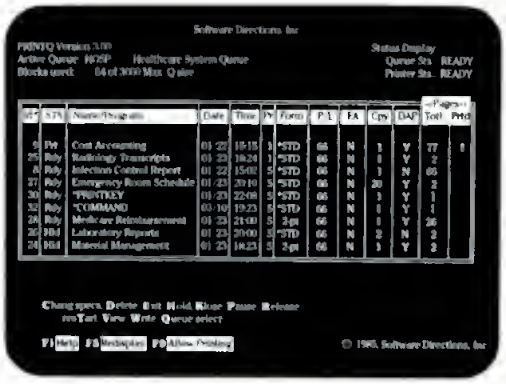
Imagine a program that prints up to 10,000 pages while you run applications.

Print Q does that. Plus prints multiple copies. Re-starts on any page after form jams. And more. All while you keep on working.

It's the first really complete print spooling subsystem for your IBM PC. And your biggest time saver ever!



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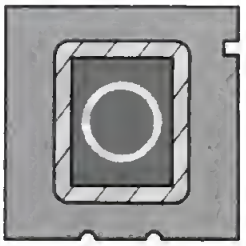
■ EDITED BY GUS VENDITTO

PC ADVISOR



Help for readers in deciding on whether to install a quad-density floppy drive and whether internal additions to a PC will require a new power supply.

QUAD-DENSITY DRIVES ON A PC

I am looking for a disk drive controller board for a standard IBM PC that supports *both* the 360K-byte disk drive and the AT's 1.2-megabyte drives.

Charles Brewster
San Bruno, California

We were surprised to see this request, since it seems most AT owners would gladly trade their quad-density drive for double-density if they could. But when another reader posed the same question, we decided it was an issue worth addressing.

Weltec Digital's Model M16-P12 (Anaheim, Calif.; (714) 630-7020; list price $149) quad-density drive works in a PC, XT, and compatibles with DOS 2.0 or later. It doesn't need a separate controller; it feeds off the same board as your double-density drives (a logic board inside the half-height drive's housing makes this possible).

While it's true quad-density drives can pack more data onto the same disk, the technology seems to be on the way out. Incompatibility with double-density is the prime reason, but unreliability is another. Far too many ATs seem unable to read the quad-density disks other ATs have created. If the double-density disk is replaced as a PC standard, it will probably be the 3½-inch, 720K-byte microfloppies used with the PC Convertible that take its place.

If you're considering quad-density in order to cut down on the number of floppies you use, we'd suggest looking at other forms of mass storage (hard disks, Bernoulli Boxes, tape). While the quad-density drive does have a cost advantage, the benefits are not that great. The only scenario in which we would unequivocally recommend the switch to quad is if you need to access a friend's or associate's quad-density disks.

WHEN TO POWER UP

I own an IBM PC with 256K, a modem, and a monochrome monitor. In the future, I plan to add a hard disk and multifunction card. I understand that I am probably going to need a larger power supply with these additions. What are the symptoms and dangers of an overloaded power supply?

Keith McNeill
Burlington, Vermont

A good rule of thumb is that a PC can handle two out of these three: multifunction board, internal modem, and internal hard disk. Because an IBM PC is so well engineered, you can take the risk of powering up after you add a new board: if it won't boot, another power supply is needed (take out the new board so you can use the computer until the new power supply is installed). The risk you take is that if your addition brings you right to the power supply's limit, the machine may boot but the power drawn by a disk access could result in a system crash at the worst possible time: when data could be lost.

Adding a new power supply will give you plenty of power, far more than you'll ever need. The power supplies sold for a PC are as powerful as the one used in the XT (rated at 130 watts, as opposed to the PC's 63.5). Reputable mail-order houses (by which we mean those that stand behind their sales) sell these for about $100.

But because your PC (with its internal modem, floppy controller, and display adapter) has room for only two additional boards, in effect, you'll be adding a new power supply to give you the features in just one more option than you could add right now. If you replace your power supply to make those two additions, you'll have used up all your options.

Consider an external hard disk (which runs on its own power) or one of the new hard disk cards that, because they are miniaturized hard disks, require less power. FileCard (Western Digital Corp., Irvine, Calif.; (714) 863-0503; list price $1,095) comes with 640K RAM and 10 megabytes storage, so you may not need to buy a multifunction card if more RAM is your primary need. DriveCard (Mountain Computer, Scots Valley, Calif.; (800) 458-0300; $1,195) has a 20-megabyte drive. It draws only 14 watts and has been successfully tested in a fully loaded PC (using a Hayes internal modem and an AST SixPack), so you could add it and a multifunction card without changing the power supply.

When you look at your situation in this light, you may realize that long-range planning warrants adding an expansion chassis, which we covered in this space recently (Volume 5 Number 8).

ASK THE ADVISOR

Send your questions about hardware and software choices you are facing to The PC Advisor, *PC Magazine*, One Park Avenue, New York, NY 10016.

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With a name that belies its thoroughness, Brief™ has every feature you've ever contemplated for your editor-in-chief. Text, from keyboard or files, is housed in multiple buffers, and scrolled through one or more windows you open, close, resize. A text buffer may be called to different windows to view two areas at once. A change in one changes both. Text blocks may be marked for printing, writing to files, movement to scrap buffers for cut and paste into other buffers, or deletion, with as many "undo" levels as you want.

To find and fix, Brief has text search abilities rivaling "grep", with wildcards for matching, indifference to intervening characters, acceptance of character ranges, even multiple choice of patterns and their replacements.

If you use Lattice, C86™, or Wizard, and have 320k, you can compile your C program without ever leaving Brief. It finds the lines with errors, and marches you through the text for repairs.

Parts of Brief were written with its own Lisp-like macro language which has structure, 32-character variable names, conditional execution, loops, and you can actually read it! Nothing like the hieroglyphs we've seen elsewhere. Bulletin board and public domain disks with macros. Disk of contest-winning macros comes free with your purchase! "Simply the best text editor you can buy". Dvorak *Infoworld* (Needs 192k.)

Ask for	List	PC Brand
U0590	$195	$CALL

MULTI-HALO *Multi-Board Graphics Library*

The premier graphics library that got the ball rolling for PC-based graphics and has grown so omnipotent that it supports over 25 graphics boards — including IBM's EGA and Nr. 9 Revolution's hi-res series — and has a multitude of mouse and printer drivers. All that in each box. Separate C versions for Lattice, M'soft, Aztec, C186. What does Multi-Halo do? Just about anything. A full "paint" was written using it. Wonderful value for single license. Costly royalties though for redistribution. Specify S0315 & Language. List $250. We $199.

WINDOWS for C/WINDOWS for DATA

Give Your Program a Clearer Outlook

FREE DEMO!

Windows for C™ is a library of over 65 functions to add the pizazz and practicality of window partitioning to your application. Unlimited windows, each defined in a C structure for easy reference throughout your program, can be made either to pop up or permanently overwrite the screen. Routines will scroll and highlight lists with arrow keys, will read and scroll ASCII files vertically and horizontally in windows, and even write to memory-loaded files off the screen.

Logical treatment of video attributes permits unchanged programs to run on color or monochrome. Colors of windows are set individually.

All functions are in separate modules; only those used are linked. Only buffers holding on-screen or temporarily obscured windows occupy RAM, others released dynamically. TopView™ compatible. Best overall rating and fastest display in Bill Hunt's 7/85 *Tech Journal* review of five windowing products.

Windows for Data comprises all of Windows for C but takes in data through the windows as well. At the high level a single function lets you specify prompt string, field length, data type, screen location, picture, target variable, then sets lesser functions scurrying to get and process a user's input — any of which functions are available directly. There are utilities to get system date and time, mess with strings, create your own field masks.

Field options can require entry, prevent entry, permit insert or overtype, beeping on invalid or overflow keystrokes, and attachment of field-specific help messages and functions you want called to display messages or validate entries. And you decide which keys will clear a field, jump to the next or prior, quit, etc. Options diverse enough that a set of "fields" can be made to behave like a Lotus™ menu.

Many compilers. Free demo.

Specify Compiler:	List:	PC Brand:
T0100 Windows for C	$195	$169
T0150 Windows for Data	$295	$259

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We refund the purchase price of any product returned within 30 days in entirely resalable condition. **You can even try out programs themselves** if product code begins with E, T, or L through N — even if it means breaking the disk seal. Some developers do pose limits, so for products beginning with other letters, opening sealed disks constitutes acceptance. But you can at least review the manual. There's just nothing stopping your buying from PC Brand.

C-WORTHY LIBRARY

FREE DEMO!

Fits Out Applications with Shipshape Interface

Many libraries launch flotillas of functions for small crafting — re-working of strings, positioning the cursor, etc. C-Worthy, by contrast, is a formidable battle wagon for major C engagements.

The C-Worthy Library™ wraps an entire user interface around your application. Its full power can be summoned by only a few high level calls. Sound exaggerated? A single function call can set up a complete text editor in a screen window.

- High level calls pop menus and scrollable choice lists to the screen, restoring the background when dismissed, and branching to the chosen activity in your application. A full function set handles doubly-linked lists defined by C structures.
- Windowing facilities open portholes of up to screen size for viewing virtual screens larger than the physical screen.
- Full context-sensitive help screen management takes over this chore. Keyboard entry routines look for the help key on their own and interrupt with pageable text windows explaining what to do next.
- Full error message interface sends error codes and the functions which return them to C-Worthy which counsels user; you get to remove all that error-checking clutter from your core program.

Your application is nested in these powerful emissaries to the outside world. C-Worthy's imaginative architecture then makes heavy use of C's pointers to functions to find its way into your application to act upon the user's request.

Separate utilities maintain help and error message text and lists in files. This text segregation means applications can readily translate into foreign languages without reprogramming — doubly so because C-Worthy display routines automatically resize for text length.

Where the high level interface does not suit you, the low level routines are available as decomposed functions. All machine dependency such as key mapping is housed in interchangeable overlays loaded alongside the application at run-time. C-Worthy applications can thus run on a mix of PC and MS-DOS machines without recompilation.

C-Worthy hands you a consistent and intuitive interface and a revolutionary design approach. Novell found it "played a key role and accelerated development" in making its NetWare™ utilities easier for users. "You owe it to yourselves to take a look." Binary Lattice. Others coming. Ingenious demo: call for it.

Ask for:	List	PC Brand:
T0500	$295	$269
T0550 Novell Network	$495	$449

C-TREE

B-Tree File Manager, Source Code, No Royalties!

C-tree™ has been around since 1979. (It became Digital Research's Access Manager™.) That means seasoned, sturdy code which hasn't cracked under the weight of prolonged and widespread use. C-tree comes in C source code, revealing all you've ever wanted to know about how b-trees are written. Provided you bind it into your binary application, you can redistribute C-tree without royalties.

C-tree's design splits nodes to allow any number of users to access an index file simultaneously even when updates are in progress. So multi-user configurations and adaptation to networks are possible. You must write record-locking routines, as they are compiler and operating system dependent, but shows how.

Thanks to source code which does not deviate from the K&R standard, C-tree can travel. Tests in many environments prove that C-tree gives your application a ticket to anywhere.

C-tree permits any number of keys for a data file, supports duplicate keys, variable record length files, multiple key indexes in a single file, etc., etc. — it's a comprehensive product with everything you'd expect. Intelligently designed, too. Both high level ISAM routines which minimize coding by handling all details of an activity, as well as decomposed step-by-step functions you can access directly. Either way C-tree maintains optimal index structures which will find the record you seek amongst a million ten-byte keys in no more than five disk seeks.

Ask for	List:	PC Brand
F0660	$395	$329

dBC

Lattice Library Maintains dBASE Compatible Files With the Power and Speed of C

dBC™ links C to dBASE. It creates and maintains files and their indexes which exactly replicate dBASE file design. So dBASE can read and update them. And the reverse. dBC can use any files created by dBASE. Now C and dBASE can operate on the same data bases interchangeably.

That opens up the widespread culture of dBASE installations to exploitation by C programmers. You can tap that market, avoid the resident dBASE language, and gain all the advantages of C with this single product.

dBC's functions parallel all dBASE's file handling commands, many decomposed to give closer control. The manual discusses each backed by demo source files on disk.

Use dBC for custom work for clients, or on its own. It's a complete ISAM file manager for C whether or not dBASE will be used in tandem, supports all four memory models, and can have sixteen index and data files open. Big discount to buyers of both dBASE II and III versions. Specify Lattice, Microsoft 3.x, or DeSmet Versions:

	List	PC Brand
L00II For dBASE II	$250	$195
LCCII With Source	$500	$390
L0III For dBASE III	$250	$195
LCIII With Source	$500	$390

CURSES *Unix Style Screen Management*

Curses from Lattice™ manages the screen of the PC like Unix™ curses. Library of 84 functions and macros parallels Unix with matching parameter lists. So your Unix program will feel at home when you move it to the PC, and programs created on the PC will be Unix compatible. Keeps any number of screen images in memory, full or partial size. Supports color, all four memory models. Vast function set to get characters, wrap lines, scroll, blank lines, highlight, etc. Carefully follows Unix curses terminal orientation by re-painting physical screen only on your refresh command.

Ask for L0850. List $125. Here $99. With Source: L0860, $250 / $199.

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Unix users have always had "lint" to thoroughly clean programs before they disappear into a compiler.

Pre-C™ looms larger than "lint". It finds problems your compiler won't. Problems that a debugger will have trouble figuring out. Even problems which will cause trouble with other compilers.

Pre-C finds all the syntactical tripwires that will blow out a compiler and much subtler problems: code which will never be accessed, casts with suspect conversions, variables declared as external but never used, functions never called, machine-dependent expressions which inhibit portability, obsolete usage.

But the big service of "lint" is thus. Compilers work with one module at a time. They know nothing of other modules which only meet up at link time. Pre-C looks at *all segments of your program at once* and reports to you any inconsistencies of inter-module references like conflicting data type declarations; parameter lists in calls which disagree with the functions themselves in number or data type.

Pre-C uses the Unix System III compiler standard to guarantee maximum portability anywhere in the C world. Plentiful command line options relax such rigor during early coding when work is incomplete.

Use purchased binary libraries? Profile them for Pre-C and it will thereafter insure that function calls from any C program are letter perfect. A miracle worker in speeding large system development. Needs 128k minimum, 192k recommended.

Ask for:	List	PC Brand:
P0590	$395	$295

DAN BRICKLIN'S DEMO PROGRAM

Slide Show Your Latest Greatest Idea INDISPENSABLE!

When the inventor of the electronic spreadsheet called with a new program, we sat straight up in our chair. VisiCalc™ was for businessmen, but Dan's latest is for us programmers.

Ever had trouble putting a program idea into words? Programs are screens! Words don't work. The answer? Show your program as a procession of screens.

Dan's new program makes it easy. It creates slide shows that imitate a program's screens and sequential activity. Create a screen — a snapshot of your planned product as it runs. Anything goes: words, borders, box rules, inverse and underlining of monochrome, foreground and background color on the CGA and EGA. Press a key and make a copy of this "slide", change it a little, by a single character perhaps, to show the next instant of run-time, then copy the slide forward again. Create a whole slide show of your program in action. It will seem like the program itself is running.

Each screen is in 80x25 character mode, not bit-mapped graphics. All 250 characters and attributes are available from scrollable lists which pop to the screen. All commands are layered in Lotus-style pop-up menus, with frequent choices mapped to the function keys as well.

Screen areas can be blocked for cut and paste or filled with color or characters, even made to blink. Slides of oft-appearing segments can be made for overlaying on other slides, and any slide may have several overlays assigned to it. Slides can be shuffled, deleted ... many quick tools to save time, disk space.

Slides can proceed at time intervals or in response to keystrokes, and depending on a user's response, you can tell the program to branch anywhere in the slide sequence to create innumerable paths through your show.

Don't make your ideas struggle through coding to get to the screen. Dan's Demo is invaluable to prototype the program you are about to write, to position all the labels, choose the color decor, smooth out the keystroke interface *before* it gets etched in code. Or load the "capture" utility above the operating system, snapshot the screens of any running program, and load an instant slide show into Dan's program. Makes tutorials a snap.

Dan's Demo has blossomed throughout Lotus™, we hear. "Lotus [was] my major test site", says Bricklin.

Each purchase entitles you to redistribute fifty copies of the slide projector program along with your show. Plain manual, no binder, to keep the price low because Dan thinks everyone should have one (he's right!). You'll wish he had Demo then and left VisiCalc for now. (Needs 256k).

Ask for	List	PC Brand:
N0100	$75	$69

BASTOC OPTIMIZES!

Translates BASIC Programs Into C

For a trifling price, BASTOC™ will move truckloads of BASIC code over to C. It is a translator which takes in Microsoft Extended or CBASIC and emits pure Kernighan & Ritchie C for the Lattice compiler. It will optionally convert your program into a single monolithic C function or will decompose it into separate functions, one for each GOSUB label.

Version 2.0 adds optimization, with dramatic reductions in execution time. It converts to C integers those numeric variables it finds in BASIC programs which really do not need floating point. It eliminates unreachable code. Where BASIC uses full assignment statements to increment and decrement counter, BASTOC converts to C's compact form, nested in other statements. Strings are dynamically allocated in the target program, ridding your application of BASIC's catatonic halts for garbage collection.

BASTOC will try to create structure of even the most convoluted BASIC code, and writes any indigestible statement into the C output as a comment accompanied by an explanation of the problem. Also, you can optionally tell BASTOC to insert BASIC source lines into the C target as comments, a dandy way to learn the differences between the languages.

Specify	List	PC Brand:
S0375 & Which BASIC	$495	$399

BTRIEVE VERSION 4.0!

Queen-B File Manager Abdicates Royalties

This queen of b-tree file managers was unapproachable to programmers for whom royalties would ruin profit margins. So it's quite a ukase indeed that one need no longer pay a tithe to incorporate Btrieve™ in applications.

Now there is version 4.0, which hugely speeds DOS interaction, especially for large files with multiple keys. It also adds support for variable length records of virtually any length. Other new features: a read after write option to verify accuracy, useful in gritty environments like manufacturing floors, file password to deny unauthorized access or read only, and data encryption to assure network privacy.

Btrieve's foundation is a balanced-tree indexing scheme, conceded to be the fastest search technique devised (it will find any key in a million-plus item index in four or less accesses). Btrieve takes complete charge of all file creation, indexing, reading, writing, insertion, deletion, space recapture, and forward and backward searching based on full or partial keys. It builds commands right into the language you use in the form of functions you call to tell Btrieve what to do.

Btrieve has mainframe specifications! A single file may have up to 24 indexes. Segments of keys may be indexed. Each index can independently accept or block duplicate keys. Fixed record lengths can be up to 4090 characters, variable length records 64k, indexes 255 characters, files up to 4 billion bytes. It can even extend a file across two drives—even two hard disks!

Interfaces to C, Pascal, BASIC and COBOL with single purchase; sample programs in all four languages.

The network version works with any network that supports the MS-DOS 3.1 file sharing function.

Code	Version	List Price	PC Brand
S0650		$245	$199
S0652	Network	$595	$529

PLINK86 & PLUS

Dynamic Cache Overlays Maximize Memory Use

Plink86™ long the overlord of overlay linkers, now has a Plus version. As a linker Plink can be used with any compiled language which delivers Microsoft/Intel format object files. It yields automatic symbol tables and more memory maps than DOS LINK, but its overlay power has won its reputation as a miracle worker. Plink86 shoe-horns large programs into small memory by binding into your compiled program an overlay manager which knows how to swap modules of large linked programs between disk and shared memory space. Plink86's straightforward overlay description language allows you to describe your overlay hierarchy in a structure permitting up to 4,095 overlays stacked 32 deep.

So if your program needs large chunks of memory, you no longer forego sales to folks who have less. But if you've assumed 128k, and they have 640k, Plink86-Plus™ knows to use extra memory as cache for overlays — at full speed compared to disk swapping. It also can automatically restore a displaced overlay to which a subsequently called overlay must return, and assign library modules to either a program's root segment or overlay areas.

Plink, the programmer's choice even when CP/M™ was the poobah of.

Code	Product.	List Price	PC Brand
S0500	Plink86	$395	$289
S0499	Plink86 Plus	$495	$359

GREENLEAF LIBRARIES

FUNCTIONS

New 3.0 has 225 functions in *both C and assembler source* as well as library format. We have versions for Lattice, Microsoft, C86, Mark Wms. New emphasis on tighter functional groupings to minimize excess baggage of functions loaded whether used or not. Manual's 250 pages now help select functions, as do demos and bulletin board. 32 DOS extensions: file and directory manipulation for 2.0 and 11 23 Screen Functions: Select mode, page, monochrome or color, palette, cursor shape, positioning, clearing and scrolling, pixel get and put, read light pen. 60 String Functions: Manipulation of strings, including center and justify, efficient list operations which add, delete, and sort pointers to strings for top speed. 50 Graphic & Printing Functions: Primitives to access all graphics, typeface, formatting, and forms control. Plus keyboard status and function key assignment, time and date algorithms, read registers, memory size, peek and poke.

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COMMUNICATIONS

Want your application to communicate with other users or remote date bases? Now you can build asynchronous communications right into your C programs! Over 60 functions and demo programs *in both C and assembler source code* set up an interrupt driven scheme with separate transmit and receive ring buffers (characters are simultaneously loaded at one end and transmitted from the other, or vice versa) for an arbitrary number of ports. Interrupt control means you can download a record, then halt the incoming stream to file it, display it, let the user tamper with it, send it back up line. It all happens within the context of *your* program. Goodbye separate communications software.

The Greenleaf Comm Library supports ASCII or binary, any parity, any word length, 8250 UARTs, all four Lattice C memory models, Hayes 300,1200,1200B and other modems.

Its 80-page manual has examples of each function and guides you through asynchronous communications.

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PANEL

Feature-Laden Screen Design Tool

The newest version of this premier programming tool lets you layer your screen designs with up to ten overlapping images, making it easy to background a screen with pop-up lists, help boxes, and alternate sets of input fields.

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Wonderfully diverse attributes may be selected for any field — size, data type, color, of course, but also conversion of input to upper case, clearance of existing data when new entry is started, masks for standard formats (eg, dates, phone numbers), a choice of styles for numeric fields, phrases which fill in when their first letter is typed, multiple-choice lists from which to choose a field fill-in by cursoring a highlighted bar. Fields may be multi-lined (eg, name and address as one field) and scrolled if larger than the screen space allotted them.

Panel builds in a user interface for keystroke movement within and between fields, and supplies extensive validation routines for checking user field entries — in source code, so you can tack on your own unique variants. Screen designs may be dynamically loaded from file, or compiled into a program, and version 6 has optimized code to quicken display speed.

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RUN/C PROFESSIONAL VERSION

Interpreter Now Accesses Binary Libraries

RUN/C was an innovator for converting inaccessible compiled C to an interpreted language as easy to grab hold of as BASIC. Great for learning, but a problem remained for pros. An interpreter expects nothing but source code, and that put the vast resource of professional binary libraries off limits.

No longer. RUN/C Professional™ has the tools dynamically to load and unload multiple binary function libraries while in its interpreter. Your code can now reach for functions in the commercial C libraries like C-Food Smorgasbord™ - opposite— potentially any library compiled with Lattice's large model. How? The manual shows how to develop the interface to a library, using the Lattice compiler (a must!). How about your own archive of functions? No reason why not.

The RUN/C Interpreter

The interpreting engine lies at the heart of both the improved original RUN/C and the new Professional version. Its creators had the inspiration to make once formidable C behave on screen much like PC BASIC with a full-screen editor like WordStar®. Just create a program and RUN it. If it stumbles, LIST it, EDIT it, add lines, delete lines, RUN it again, fix it again. Use familiar commands like LOAD, MERGE, SAVE, FILES, even TRON and TRACE, and a free profiler.

RUN/C is ideal for rapid program development. Put up code at high speed, tinker and re-arrange, try out things devil-may-care, and let RUN/C find your typos and malaprops.

RUN/C has a treasury of functions built into the interpreter — over 100 paralleling the most used functions found in standard compiler libraries. So when and if the time comes to compile, your source code will find counterparts.

There are lots more features — system interrupts, a shell command to invoke any operating system command without leaving RUN/C, even the ability to load a preferred editor in parallel and switch back and forth.

RUN/C Standard Version

Straight RUN/C has all above but the Loadable Libraries™ docking module. It utilizes source code only, whether created by its own editor, or from any ASCII file, such as programs you've already written, or commercial libraries which supply source code.

It makes a splendid teacher. The manual has not just instructions how to use RUN/C, but its 500-plus pages provide a thorough-going demonstration of the C language itself. Every feature, of C or RUN/C, is accorded its own micro-chapter. Over 100 of these chapters are devoted to RUN/C's built-in functions, and every one lists a sample program showing how it is used. The programs are also on the disks. So as you read them in the manual, you can run them on the screen. (Needs 180k-256k recommended.)

RUN/C Professional

RUN/C Pro has every feature of RUN/C regular plus the binary library link-up and an extra level of debugging aids. They are ingeniously installed behind a built-in function, so you can call for debugging conditionally. The called function paints a menu of debugging tools to choose from, including immediate mode to display variables, single-step tracing, and changing of variables.

RUN/C Professional can tackle projects of any size. Use it as a creative front end to feed a continuous stream of source code into compiled modules. Only the source work in progress is still interpreted, the finished modules will whiz by at object speeds. It will change how you work. (320k minimum and S12k recommended to fit libraries.)

RUN/C. quite a run for your money.

Ask for		List Price	PC Brand
S0910	RUN/C Classic	$120	$109
S0950	RUN/C Pro	$250	$185

LATTICE C VERSION 3.0

Major Upgrades to the Best Selling C Compiler

Lattice has labored and come forth with the long-awaited Version 3.0 of its top-rated compiler. A long list of enhancements, adoption of the ANSI draft standard, documentation rivaled by few, and add-on libraries matched by none in sheer quantity restore Lattice C™ to its leadership role as the C compiler to beat.

Lattice now embraces key UNIX™ enhancements which have entered the language since Kernighan & Ritchie: void functions returning no value, enumerated data types to assign stepped values to variables, the ability to pass data between structures by assignment statements. And 3.0 adopts checking of external function arguments by data type as proposed by ANSI to kill bug swarms when modules join up at link time.

The greatly expanded libraries, now comprising 325 functions(!), enable the file sharing and record locking provisions of DOS 3.1, provide a full complement of transcendentals, and a host of utilities to mimic the UNIX and XENIX™ environments.

Lattice now delivers smaller .EXE files, curing one past complaint, boasts very fast link times and a more efficient aliasing algorithm.

The compiler now defaults to the ANSI proposed standard when you need a strictmistress, but command line options tolerate straying. New options generate code to use 80186 and 80286 features, and the 8087 is of course sensed and utilized if aboard.

Lattice has enjoyed pre-eminence so long that developers have created far more tools to marry into Lattice C than any other compiler. Programmers now have an enormous resource of libraries and utilities to use with Lattice to speed their work. William Hunt, in his exhaustive analysis of 12 compilers in the 1/86 issue of the *PC Tech Journal* awards Lattice the only "very good" rating for add-on library availability. He sums up with this all-around accolade: "a fine product to consider for the production of important applications."

Ask for	List	PC Brand
S0100	$500	$CALL

BETTER BASIC

New Version Compatible with Microsoft BASICs

This hearty implementation provides a real alternative to technical languages like C. It melds the most useful features of C, Pascal, and Modula 2 into BASIC, while retaining the familiarity of a language already known to millions. And now Version 2.0 is 100% compatible with Microsoft's GW™ BASIC and IBM BASICA including graphics, sound, and assembly language calls. Just load old programs and run. Save and they are converted to BetterBASIC.

It's big. BetterBASIC's hugely expanded features require 192k, your programs can go all the way to the PC's full 640k. It's comfy. Behaves like Microsoft BASIC at the interactive level, with a full-screen editor, direct statement execution, and always poised to RUN. It's fast. BB is an incremental compiler—unlike with interpreters each statement is checked and compiled just once. The Sieve benchmark runs *six times faster* than with Microsoft.

BetterBASIC® has C-like structures for reference to entire records so say goodbye to FIELD, MKI$, CVD, LSET, etc. It has "procedures" summoned by name unlike GOSUBs. Lots more features: built-in linker for compiled modules, trace, debugging breakpoints, cross-reference command, 32k strings, DOS and BIOS calls and interrupts, recursion.

Ask for		List Price	PC Brand
S1200	BetterBASIC	$195	$169
S1201	Run-time Module	$250	$239
S1202	8087 Interface	$ 99	$ 89
S120S	Btrieve Interface	$ 99	$ 89

The GSS GRAPHICS SYSTEM

Leave the Driving to GSS

ANSI CGI STANDARD!

GSS™ has reconfigured two components of its comprehensive graphics tools to conform with the more advanced ANSI Computer Graphics Interface (CGI) standard.

At the heart of the system is now the Development Toolkit which contains all language interfaces and device drivers for keyboards, mice, joysticks, tablets, printers, plotters, cameras, and more. Drivers now house all management of vector graphics (plotters) and bitmaps used by raster input devices (scanners) to insulate completely the application program from concern for device idiosyncracy. No one else has implemented CGI that way. It means programming remains generic, just switch drivers and the same program will drive a different device, including intelligent controllers which do not want micro instructions.

GSS Kernel™ conforms to level 2b of ANSI's Graphical Kernel System (GKS) and contains all its needed drivers and language bindings. Kernel has macro level tools to draw and color an object, store the sequential instructions, and recreate the object on its own, as well as segment it, transform it, etc., all the while returning data on attribute settings, system and device status. So powerful, a single command may represent several score lower level statements.

Plotting has the equivalent GKS tools for graph and chart generation and their captioning: hand it apples and oranges, say "pie", and it bakes the numbers into a digestible display for screen or plotters.

Kernel and Plotting have tools to convert images they create to ANSI Computer Graphics Metafiles (CGMs), a tokenized standard for storing every form of graphic image as data. The Metafile Interpreter reads the contents of a CGM and interprets it with full CGI capability for re-creation on various devices, and you can cut and paste before display.

Quality software? IBM thinks so. They sell the GSS series under their own label.

Unit royalties and annual fees have been instituted for redistribution. Call for schedule. Needs 256k.

Ask for		List Price	PC Brand
GS010	CGI Dvlpmt Toolkit	$395	$339
GS020	Kernel System	$495	$419
GS030	Plotting System	$295	$249
GS040	Metafile Interpreter	$250	$209

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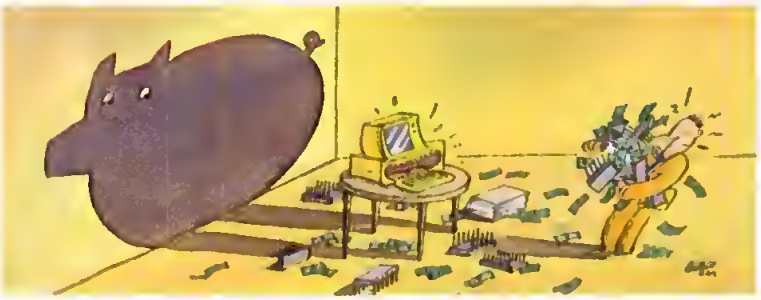

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PC MAGAZINE NEWS

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Toshiba T3100: Compaq Power, Compact Package

PC FIRST LOOK

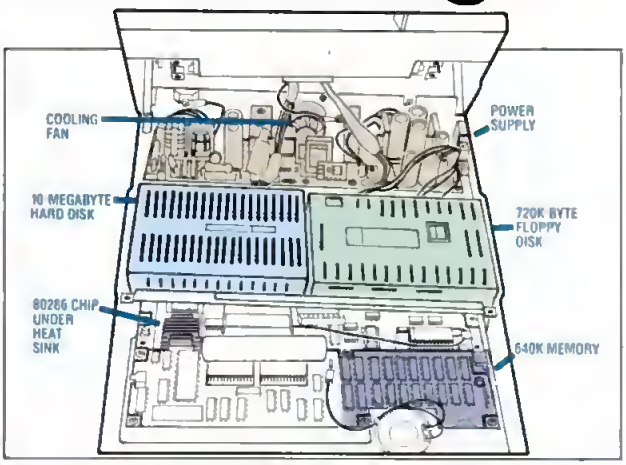
A 10-megabyte hard disk, an 80286 processor, and a gas plasma screen in a 15-pound unit.

BY BILL HOWARD

When Compaq downsized its 80286-based portable in February, it eliminated 17 percent of the weight and 30 percent of the bulk of the Portable 286. The result was pleasing but incremental: lugging the 26-pound Portable II around airports was still something you had to do, not wanted to do. Now comes Toshiba, better known for TV sets, VCRs, and some of the world's best 24-pin dot matrix printers, with an 80286 portable that puts Compaq to shame.

Compaq and Toshiba part company over the portable PC question, "What do the people want?" For Compaq, that always meant a 5¼-inch floppy disk, a CRT-based monitor, expansion slots for PC accessory

(continued on next page)



Surface-mount technology helps Toshiba keep its $4,499 T3100 compact. The motherboard with the CPU and 640K bytes of RAM (and room for a 2-megabyte RAM expansion card) fits under the keyboard mounting in the foreground above.

PC's Limited Sets A Speed Record

PC's Limited 286 12 runs at 12 MHz and costs $2,695 without a hard disk drive or a monitor. With just one disk drive bay (but room for three drives), the unit is no wider than its keyboard. The inset shows SmartVU, a unique diagnostics panel.

PC FIRST LOOK

The 12-MHz 80286 makes the $2,695 286 12 the fastest AT compatible.

BY JOE DESPOSITO

The latest computer from PC's Limited runs twice as fast as the IBM PC AT, yet costs just $2,695. The 286 12 is an AT compatible that can run at either 6 or 12 MHz. At 12 MHz, the 286 12 took 48 seconds to handle the PC Magazine Labs benchmark test of a *1-2-3* application that the standard 6-MHz PC AT does in 98 seconds. In the PC Labs prime-number benchmark test, the 286 12 took 10 seconds, while the PC AT took 20. Most 8-MHz AT compatibles, such as the Compaq Deskpro 286 and the new-version PC AT introduced April 2, need about 14 seconds.

The speed of the 286 12 does not come just from adding a faster crystal. There are also 100-nanosecond dynamic RAM chips along with 8-MHz DMA, counter/timer, interrupt controller, and clock generator chips, which support speeds up to 16 MHz. In addition, the 80286 chip used in the machine is the new 12.5-MHz-rated chip. As PC's Limited president Michael Dell notes, "Performance is something people never get enough of."

Smaller Footprint

Speed is not the only plus of the 286 12. The unit has a foot-

(continued on page 35)

Photograph Thum O'Connor, Technical Illustration, Tony Cinquina

Toshiba T3100

(continued from preceding page)

cards, and—as a result—25 to 30 pounds of weight. Toshiba surmises that you don't care about expansion slots if all the necessary features are included and that you won't miss a bulky CRT if gas plasma display technology gives equal readability, and it hopes that you don't mind 3½-inch disks.

The T3100 is a little beefier than IBM's PC Convertible or the Gridcase 3, with which it shares a resemblance because of the dark case and orange screen.

Hands On

For $4,499, the T3100 provides:

- An 80286 processor running at the same 8-MHz speed as 80286 Compaqs and the new IBM PC ATs, offering 3 to 5 times the speed of stock PCs.
- 640K bytes of memory, with the option to add 2 megabytes more using two banks of nine 1-*megabit* chips.
- A 3½-inch Toshiba 720K-byte floppy disk (the same one, including disk format, that IBM uses) and a painfully slow (150-millisecond access time) JVC 10-megabyte hard disk, with a 20-megabyte unit promised.
- Serial, parallel, RGB monitor, and external 5¼-inch floppy disk ports standard.
- Room to add a $400 300/1200-bit-per-second Hayes-compatible modem.
- A 115/230-volt capability.
- Nice little touches. For instance, the pull-out carrying handle in back protects the I/O ports and rotates 90 degrees to tilt the unit for better viewing.

The biggest space saver is the 9-inch diagonal CGA-compatible gas plasma screen with each line scanned twice for 640 by 400 resolution. The permanently attached screen housing is 1¼-inch thick, about the size and heft of an Etch-A-Sketch. The orange characters on a dark background are highly readable; screen updates are very fast.

The convoluted keyboard layout of Toshiba's T1100, an excellent 8088-based battery-powered LCD laptop, may have cost it our Editor's Choice among portables (see "DOS to Travel," page 108). Toshiba wised up with the T3100. The number keys are in a single row and the ten function keys in a single row above that; the cursor keys are arranged the same as on the new ATs and XTs.

Except for the hard disk access speed, where Toshiba traded performance for a skinny third-height unit, the T3100 is the equal of the Compaq on PC Magazine Labs tests.

If you're on the road and swapping data with other PCs, the Toshiba won't be as convenient as the Compaq until 3½-inch drives become more prevalent. Toshiba's solution is a companion external 5¼-inch drive; together they still weigh less than a Compaq. There's also a "PC Floppy Link," an interface card and cable that lets the Toshiba control another PC's drive.

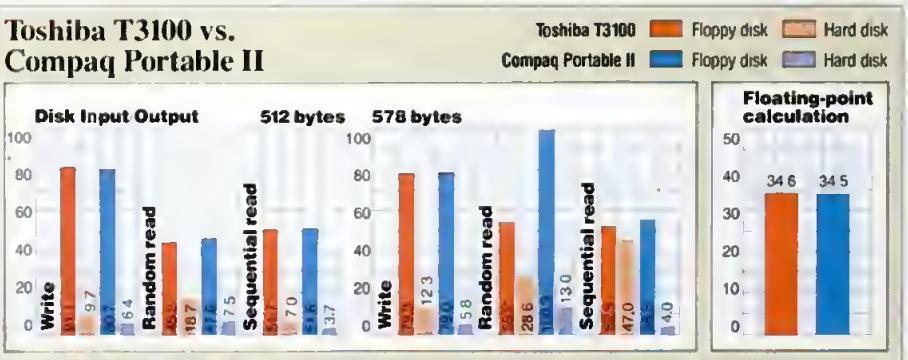
Since it runs only on AC power, the T3100 is not the machine for notetaking on cross-country flights. But if you need the most transportable power in the smallest, sleekest package, there may be a Toshiba T3100 in your future. PC

At 15 pounds and 12 by 14 by 3 inches, the 80286-based Toshiba T3100 undercuts the Compaq Portable II by 43 percent on weight and 61 percent on volume, while conceding nothing on performance.

Photograph: Thom O'Connor

PC LABS BENCHMARK TESTS

Toshiba T3100 vs. Compaq Portable II



The Disk Input Output benchmark test measures the time it takes to create a 200K-byte data file using record lengths of 512 bytes and 578 bytes. The test program then performs a random read of 256 records from the created data file, followed by a sequential read of the same records. The table shows the results in seconds.

The Floating-Point Calculation benchmark test measures processor speed by looping through a series of floating-point calculations including multiplication, division, exponentials, and logarithmic and trigonometric functions. The test program uses the floating-point library included with Microsoft C 3.0.

PC MAGAZINE FACT FILE

Toshiba T3100
Toshiba America Inc.,
Information Systems Div.
2441 Michelle Dr.
Tustin, CA 92680
(714) 730-5000
List Price: $4,499 with 640K RAM, 10-Mbyte hard disk, 3½-inch 720K floppy disk; internal 300/1200-bps modem, $399; external 5¼-inch floppy disk drive, $499; prices to be announced on expansion chassis (five PC-compatible slots), 15-key numeric keypad, 2-Mbyte extended memory RAM card, PC Floppy Link (controls 5¼-inch floppy disk drive of desktop PC).
In Short: A revolutionary 80286-based portable from Toshiba that packs the power of a PC AT in a 15-pound shell slightly larger than IBM's new PC Convertible. It doesn't run on batteries, and the hard disk is slow, but the highly readable gas plasma screen, sleek styling, and 286 performance make the T3100 a real winner.

CIRCLE 442 ON READER SERVICE CARD

PC's Limited

(continued from page 33)

print that is about 20 percent smaller than that of the PC AT, yet still includes the eight expansion slots found in the AT. The space saving comes from a smaller system board that uses custom LSI chips. Also, instead of two disk drive bays, there is one with room for three half-height units or one full- and one half-height drive.

The hard disk that PC's Limited markets for this machine is a 40-megabyte half-height drive manufactured by Tandon. Rated at a 35-millisecond average access time (the AT is 40), it tested at 27 milliseconds.

The keyboard is feather light compared with the AT's, and when it was dropped on a carpeted floor, the Spacebar popped out. The keyboard has the old AT layout, but you may not like the feel. One nice feature is a switch on the back that lets you "move" the Esc key to the position it was on the original PC keyboard.

A front-panel display, called SmartVU, includes a red LED bar graph that indicates processor activity, a red LED for disk activity, and a green LED for processor speed. A green LED matrix displays information from a sophisticated diagnostics program built into the BIOS, telling users what might be wrong. For those who find the panel irritating, it can be turned off from the keyboard.

The $2,695 price of the system includes 1,024K bytes of RAM, a 1.2-megabyte high-density floppy disk drive, and a floppy/hard disk controller. Options are a 40-megabyte half-height hard disk for $895, a 60-megabyte tape backup for $795, an EGA graphics card for $269, and an EGA color monitor for $479 (PC's Limited relabeled one of the very-best-selling $785 list-price monitors). For the less speed-hungry PC user, $2,295 buys the 286 10—the same system with a 10-MHz processor.

The 286 12 sets a new standard of performance on 286 machines. It should find an enthusiastic following among PC power users and those who are involved in CAD or other graphics applications. The keyboard is the weakest point, although many people will find it acceptable. Overall, the 286 12 offers impressive performance at an affordable price.

Sanyo MBC 990: Well-Built, Affordable IBM PC AT Compatible

PC FIRST LOOK

BY JOE DESPOSITO

Sanyo's new MBC 990 is an AT clone that is switch selectable to run at a clock speed of 6 or 8 MHz. A push-button switch inset at the rear of the computer is used to select the 8-MHz mode. At this speed, the MBC 990 was 15 to 20 percent faster in PC Magazine Labs benchmark tests for processor speed than the original AT. Other than the speed switch, the Sanyo has nothing much else to distinguish it from the AT.

The Sanyo is exactly the same size as the PC AT and has the same disk space—it can fit two full-sized disk drives side by side at the front of the system unit. Although the front panel of the Sanyo looks different, inside the computers are basically alike. The Sanyo has the same number and type of expansion slots as the AT and has 512K bytes of RAM on the system board, also like the AT.

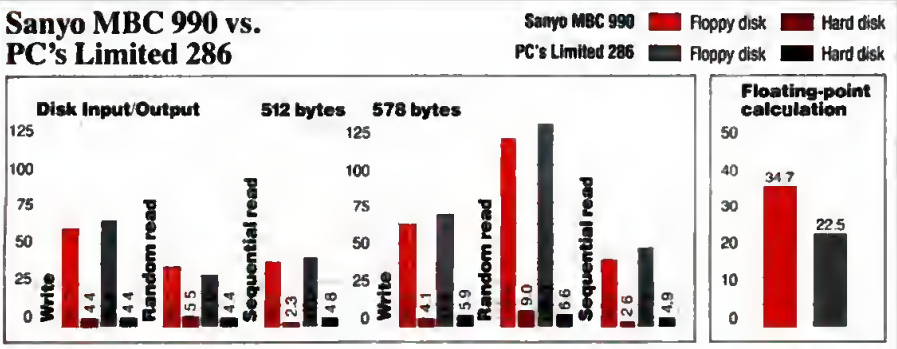
The Sanyo keyboard duplicates the old PC AT keyboard layout, but LEDs are imbedded in the keys rather than in a separate spot on the top of the keyboard. The feel of the keyboard is different from the AT's—it lacks the AT's click—but it's acceptable.

(continued on page 43)

The Sanyo MBC 990 (left) is a well-built $2,599 8-MHz AT compatible. The $2,695 PC's Limited 286 12 (right) runs at 12 MHz and yet is no wider than its keyboard.

PC LABS BENCHMARK TESTS

Sanyo MBC 990 vs. PC's Limited 286



The Disk Input/Output benchmark test measures the time it takes to create a 200K-byte data file using record lengths of 512 bytes and 578 bytes. The test program then performs a random read of 256 records from the created data file, followed by a sequential read of the same records. The table shows the results in seconds.

The Floating-Point Calculation benchmark test measures processor speed by looping through a series of floating-point calculations including multiplication, division, exponentials, and logarithmic and trigonometric functions. The test program uses the floating-point library included with Microsoft C 3.0.

PC MAGAZINE FACT FILE

PC's Limited 286 12
PC's Limited
1611 Headway Circle,
Bldg. 3
Austin, TX 78754
(512) 339-6800
List Price: $2,695; 10-MHz version (286 10), $2,295.
Requires: Graphics adapter, monitor, hard disk drive.
In Short: The 286 12 is an IBM AT–compatible computer that runs at 12 MHz. The system board uses the fastest versions of microprocessor, RAM, DMA, and other chips to maximize speed, and the optional 40-megabyte hard disk is rated at an average access time of 35 milliseconds. The 286 12 is a well-designed machine that offers outstanding performance at a reasonable price.

CIRCLE 439 ON READER SERVICE CARD

What'sBest! Adds More Clout to 1-2-3

PC FIRST LOOK

BY JARED TAYLOR

What'sBest! is a remarkable new program that brings the power of linear programming within reach of *1-2-3* and *Symphony* users. At $695 and $995 for the commercial and professional versions, respectively, this spreadsheet add-on can be more expensive than the spreadsheet itself, but for anyone who really needs it, it's a bargain.

Version 1.1, recently released, now works with *1-2-3*, Release 2.

Linear Programming

Just because you may not have heard of linear programming doesn't mean it can't help you. Imagine, for example, that you are the publisher of a computer magazine and have data from a readership survey. You have four categories of readers—advanced computer users (A) and beginners (B), with both groups subdivided by gender. You also have four kinds of editorial material: columns, reviews, news, and user tips.

Your survey shows that different readers read different amounts of different editorial material. Advanced male users, for example, read only 10 percent of the user tips, while beginners read 75 percent. You want to put together a magazine of which at least 35 pages will be read by advanced users and at least 30 pages by beginners.

Editorial materials have different costs, though. Columns are $550 a page, but tips are only $125. What is the editorial mix that will satisfy your readers but will also cost the least? Even with a one-page spreadsheet like this one, it would take a lot of what-ifs to get an idea of the right mix, and even then you couldn't be sure you had the very lowest figure. With a really complex model, you might be way off.

> This spreadsheet add-on can be more expensive than the spreadsheet itself, but for anyone who really needs it, it's a bargain.

What'sBest! can give you the answer in one pass. You call up its small (8K bytes) memory-resident portion from within your spreadsheet and use its pop-up menu to indicate that you would like to minimize the Total Cost figure. You also indicate that the Pages to Publish figures are the ones to adjust to get the minimum cost.

So long as your model is set up correctly, *What'sBest!* will then run its 157K-byte disk-based program and come up with the lowest-cost editorial mix (see screen shot). In this case, you'll need a total of 129 pages (rounded down), with 15 pages of reviews, 99 pages of news, and so on. You won't have to spend one cent on expensive columnists.

Most Profitable Mix

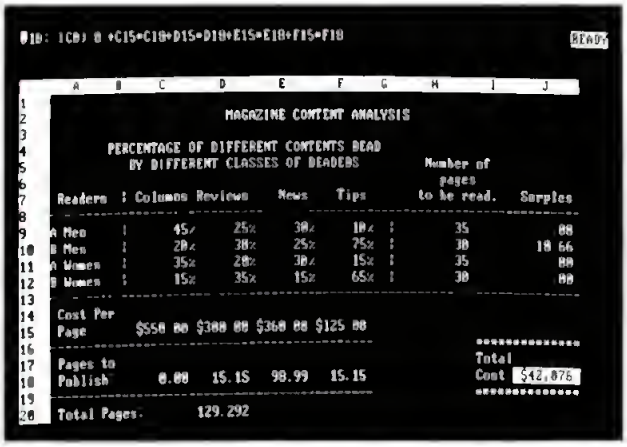
The Surplus numbers at the far right of the screen show you that three classes of readers will be "just satisfied" with the contents—they'll read their minimum quota of pages and no more. Male beginners will be the happiest readers because in order to meet the minimum requirements for other readers, you had to put in an extra 10 pages that male beginners will read in addition to their minimum of 30. At a total cost of $42,076, this is the cheapest mix you can get by with and still satisfy all readers.

What'sBest! could let you spiff up this simple example in any number of ways. You could make it solve for whole numbers of pages rather than fractions, and you could fix a minimum number of pages for columnists, say, and adjust the rest. Also, you could set up a "diminishing returns" system, which would indicate whether interest in news began to drop off after, say, more than 30 pages of the stuff. This would keep you from getting such lopsided, news-oriented results.

As this example shows, *What'sBest!* solves problems when different combinations give different results. If you build five products from a selection of 50 different materials, and each product has a different profit margin, *What'sBest!* tells you the most profitable product mix. Or if you have to schedule different work shifts for predictably varying manpower requirements, it finds the cheapest schedule.

The two versions of *What'sBest!* are identical except that the professional model handles larger spreadsheets, requires more memory, and costs more. Both need a work space on your disk that is at least twice the size of the model. Calculations slow down with more variables, but a math coprocessor will cut the time to about a third.

The program itself is easy to use and well documented. The trick is learning how to build models with which *What'sBest!* can work. The program flags errors in your logic and the manual gives good troubleshooting advice, but if you're new to linear programming, you'll have to do some thinking. However, if you understand both linear programming and spreadsheets, you can get right to work. And if you compare *What'sBest!*'s answers with the ones you get from what-ifs, you might find that the program pays for itself in the first couple of hours. PC



In this example, What'sBest! *calculates the lowest-cost magazine production figure based on readership, editorial content, materials, and fees.*

Photograph: Thom O'Connor

PC MAGAZINE FACT FILE

***What'sBest!*, Version 1.1**
General Optimization Inc.
2251 N. Geneva Terr.
Chicago, IL 60614-9990
(312) 248-0645
List Price: 256K version. $695; 640K, $995.
Requires: 256K or 640K RAM, two disk drives, DOS 2.0 or later; any version of *1-2-3* or *Symphony*, Version 1.1.
In Short: Expensive but worthwhile linear-programming add-on to *1-2-3* and *Symphony* to help select the best option from a series of what-if possibilities. Copy protected.

CIRCLE 421 ON READER SERVICE CARD

AMERICA'S NEXT FAVORITE MOUSE.

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LOGITECH has been the leading OEM mouse company for years, quietly providing mice to companies like AT&T, DEC, and H-P. We've designed LOGIMOUSE C7 just for the retail marketplace. And poured all our years of hardware engineering into it. You simply can't find a better mouse.

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- LOGIMENU—Programmable Pop-Up Menu System: Customizable for all your favorite keyboard-based applications. Fully compatible with Microsoft Menu, only better.
- CLICK: A new concept in mouse software! It resides in memory, detects which application you are running and sets the mouse to your predefined setting. You define macros for the mouse buttons, set the mouse baud rate and protocol, define the pop-up menus to be used by LOGIMENU. Just add CLICK to your autoexec file and LOGIMOUSE will be ready to go with each of your favorite applications. So you can get down to work.
- POINT-AND-CLICK SHELL for Lotus 1-2-3: No more jerky cursor movement, no more delays, no more beeping. To select a cell, execute a command, scroll your spreadsheet, or call up context sensitive pop-up menus, just point with the mouse and click!
- POINT EDITOR—Mouse Based Program Editor: If you think a mouse was not meant for editing, POINT will change your mind.

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☐ LOGIMOUSE Plus Package	$119	
☐ Plus Package Software	$ 29	
☐ Base LOGIPAINT SET	$149	MONEY BACK
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Harvard Graphics Mixes Power and Ease of Use

PC FIRST LOOK

BY JON PEPPER

Graphics programs have often been hampered by a combination of ills: either too few or too many features, high price, or difficulty in producing quality output without resorting to exotic peripherals. The *Harvard Presentation Graphics (HPG)* package from Software Publishing Corp. looks like a cure.

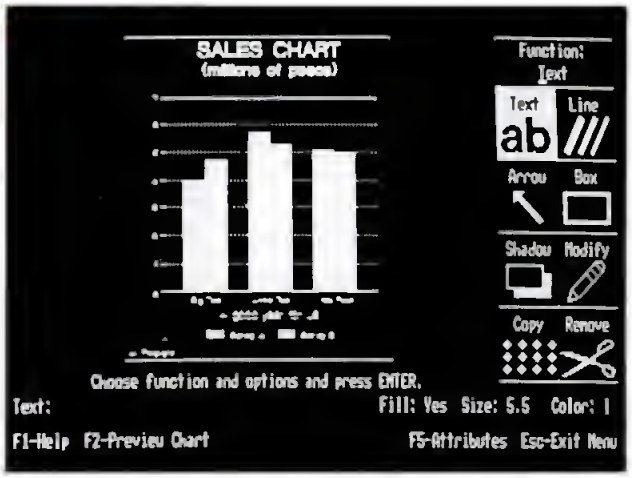
Harvard Presentation Graphics combines features for producing structured and free-form text, graphs, and charts into one easy-to-use package.

Software Publishing Corp. has a reputation for creating programs with functionality and a quick learning curve. The package comes on two disks, a utility disk and a program disk, and installation is quick, painless, and simple. The configuration options (monitor type, printer/plotter type, border style, default type style, and so on) are easily set and modified. Having these configuration options is helpful if you plan to use different output devices or change your basic type style often.

Menu Choices

HPG is menu driven and has an extremely intuitive interface. All major options—create new chart, produce output, save and retrieve files, and so on—are menu choices. In fact, the functions move in such a logical fashion that you might find you don't need to use the manual.

Help, if needed, is always available by pressing F1. Although you can use *HPG* without the documentation, it would be a shame to overlook it. The documentation is simply superb: clearly written and beautifully produced, with numerous concise examples of how to use the various *HPG* functions and even full-color reproductions of color-chart options.



The Annotate option lets you greatly enhance a Harvard Presentation Graphics *($395) chart or graph before printing and adding arrows, shadows, boxes, and text.*

Invoking any menu choice will lead you to a series of pop-down windows that allow you to enter text information and numerical data, or verify and/or change any configuration option. Because *HPG* uses most predefined formats for its charts and graphs, creating a chart or graph should literally take only a matter of minutes, even for a novice user. Although there are some high-end programs that can produce more chart styles than *HPG*, the range of options here is impressive. Free form text—as well as title, organization, pie, column, line, point, and area charts—are among the standard formats.

Software Publishing has paid particular attention to modification of charts on-screen. Once your basic chart is done, the Annotate Chart function extends the range of appearance options. You can use it to add shadow effects and pointers, draw lines, copy or remove elements, insert text, and box any area. You can also add three-dimensional effects from this menu.

On-screen Previews

Throughout *HPG*, you can always preview your changes on-screen by pressing F2 and then return to the editing function just as easily—an ability that is sorely lacking in many other graphics programs.

HPG offers a choice of five basic type styles: executive, roman, sans serif, script, and gothic. You can also change the attributes of most type styles by specifying underlining, boldface, italics, and no fill (outline), either alone or in combination. However, not every attribute change is available for every type style, and there is no facility for mixing type fonts on a single chart. You do have a choice of three output modes (draft, standard, and high quality), and you can specify at the time of printing that any chart or graph will print as full, half, ⅓, or ¼ page; *HPG* will take care of all of the necessary rescaling.

HPG supports a wide range of printers and plotters, as well as several virtual display interface (VDI) high-quality-output devices (like the Polaroid Palette and the CalComp ColorMaster Printer). Its special device drivers enable it to produce high-quality graphics on even such moderately priced printers as the Epson FX-85. Although *HPG* can specify up to 16 colors, you can't see any color changes on-screen unless you use the EGA board.

Direct 1-2-3 Imports

Harvard Presentation Graphics supports any true PC compatible and numerous graphics boards; it will run beautifully with only 256K bytes of memory and an IBM Color/Graphics Adapter. *HPG* can import any ASCII file and read *1-2-3* data and graphs directly. If you use *PFS:Write*, you can also export *HPG* files directly for inclusion into your word processing documents.

Another of *HPG*'s niceties is the slide-show feature. Texts and charts can be chained to produce a sequenced show of up to 49 charts on-screen. Slide shows can also be batch-printed as a continuous file.

While there may be a few esoteric types of analytical charts it doesn't support, *HPG* will cover the presentation graphics needs of most users. For producing dazzling title pages, color transparencies, slides, and attractive graphs, *HPG* is a superb choice. It's flexible, fast, easy to use, and well thought out. If you're in the market for presentation graphics, you'd be doing yourself a disservice if you overlooked this product. PC

PC MAGAZINE FACT FILE

Harvard Presentation Graphics
Software Publishing Corp.
1901 Landings Dr.
P.O. Box 7210
Mountain View, CA 94039
(415) 962-8910
List Price: $395.
Requires: 256K RAM, color/graphics adapter (or other graphics card).
In Short: *Harvard Presentation Graphics* is a first-rate graphics package, combining text, charts, and graphs into one very-easy-to-use package with a variety of high-quality output options. Fast and flexible. Not copy protected.

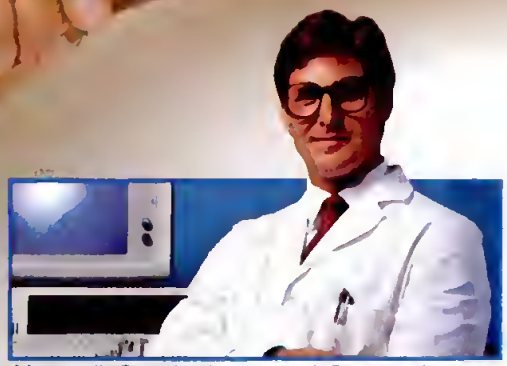
CIRCLE 423 ON READER SERVICE CARD

Photograph: Thom O'Connor

Maynard Has A Little Surprise For IBM PC Users.

Surprise,™ Maynard's new high-speed board increases your IBM PC's* speed up to 2½ times, and doesn't take up an expansion slot!

"I just calculated my Lotus spreadsheet in a fraction of the time it used to take! Maynard's new Surprise is fast!"



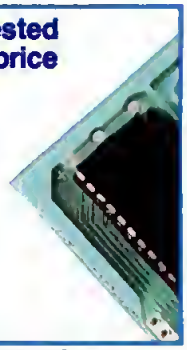
"Maynard's Surprise jumps the PC's speed to 2.6 on the Norton SI scale! That's over 2½ times its normal speed!"

"I installed Maynard's Surprise even though I didn't have any expansion slots left! Was I surprised! Now my PC's faster than ever!"

*IBM PC and XT are trademarks of International Business Machines. Compaq is a trademark of Compaq Computer Corporation. NCR is a trademark of NCR Corporation. Prices for Compaq and NCR Model 4 are slightly higher.

just **$249!** suggested retail price

- increases PC speed up to 2½ times!
- doesn't use an expansion slot!
- installs in seconds!
- works with the IBM PC and XT, Compaq, and NCR Model 4*!
- surprisingly low cost!



Available at the finest computer stores.

CIRCLE 478 ON READER SERVICE CARD

Maynard Electronics

Shaping tomorrow's technology.

460 E. Semoran Blvd., Casselberry, FL 32707 305/331-6402

This Is One Time IBM's Size Is Not An Advantage.

When it comes to a portable computer, smaller is better.

That's one reason the new dual disk drive Toshiba T1100 PLUS has it all over the IBM PC[1] Convertible.

But our new portable PC is not only smaller than the IBM. It's also lighter. And more powerful.

How much smaller? A full 20%. And theirs weighs 12.2 pounds. Ours is under 10 pounds.

And with theirs, if you want serial and parallel ports or a CRT port, you have to add add-ons.

Which makes it even bigger and heavier. And more expensive.

With the T1100 PLUS, the serial, the parallel and the CRT ports are standard built-in features. Simple mathematics tells you which portable is more portable. And more affordable.

WE TAKE THE PORTABLE PC TO A HIGHER POWER.

Before we go any further, we have to tell you there is one thing about the T1100 PLUS that's bigger than the IBM portable. It's maximum memory capacity. Ours is 640K of RAM. Theirs is only 512K of RAM.

Now we can tell you that the T1100 PLUS is faster than the IBM. Our 80C86 microprocessor lets you zip through work at twice the speed.

ANOTHER CLEAR ADVANTAGE.

The Toshiba T1100 PLUS uses a high-contrast, high-resolution LCD display screen. It shows 25 lines by 80 characters of text with 640 x 200 resolution, tilts to any convenient viewing angle and folds flat when you use a CRT monitor.

The IBM portable also uses an LCD display screen. But it doesn't have as much contrast. It doesn't tilt to as many convenient angles. And you have to pull it off to hook up another monitor.

ONE MORE THING THAT MAKES US EXCEPTIONAL.

Of course, the Toshiba T1100 PLUS is fully IBM-compatible. So you can run popular software like Lotus 1-2-3,[2] WordStar[3] and dBASE III.[4]

And, as we mentioned, it has two built-in 720K 3.5" disk drives. It also has an optional 1200-baud Hayes[5]-compatible internal modem and runs on built-in rechargeable batteries. Just like the IBM portable.

But should either stop running, only Toshiba guarantees you overnight delivery of a replacement while yours is being fixed. It's all part of our "Exceptional Care" program.

To find out more about the T1100 PLUS, call 1-800-457-7777 for the name of the authorized Toshiba dealer near you. And see why being small is going to make us one of the biggest things in PCs.

In Touch with Tomorrow

TOSHIBA

TOSHIBA AMERICA, INC. Information Systems Division

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CIRCLE 534 ON READER SERVICE CARD

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Maximum Fields per Record	65,000	128	400
Maximum Files per Database	Unlimited	Unlimited	40
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Multi-Value Fields	•		
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3COM EtherSeries™ (2.4/3+)	•	•	•
Nestar Plan 3000/4000	•		
All Versions of Novell NetWare™	•		
Tapestry	•		
Alloy NTNX	•		
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Full Record Locking During Relational Operations	•		•
Application Generator Automatically Creates Locking Statements	•		
Network DBMS Can Span Multiple Volumes or File Servers	•		
Network Run-Time Module	•		
Minicomputer Communications[1]	•		

1) From original manufacturer

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CIRCLE 218 ON READER SERVICE CARD

Sanyo MBC 990

(continued from page 35)

One-Third Faster

When running at 8 MHz, the Sanyo performed a PC Magazine Labs *1-2-3* benchmark test in 70 seconds, while the AT took 98 seconds. A prime-number calculation test also ran faster on the Sanyo—17 seconds compared with 20 seconds on the AT. In addition, the Sanyo surpassed the AT in all PC Labs hard disk read/write benchmark tests.

The suggested retail price of the basic system—an 80286 processor, 512K bytes of RAM, and a 1.2-megabyte high-density floppy disk drive—is a very competitive $2,599. And it doesn't appear that Sanyo scrimped on materials. The unit is solidly built—with a steel case and cover—and its power supply is rated at 200 watts.

Although the Sanyo is basically a straightforward clone of the IBM PC AT, it appears to be a reasonable alternative to that machine for cost-conscious consumers looking for somewhat improved performance over the standard IBM AT.

The AT-compatible Sanyo MBC 990 alternates between 6- and 8-MHz by pushing a switch at the rear of the unit. It's accessible through a window on the back panel.

PC MAGAZINE FACT FILE

Sanyo MBC 990
Sanyo Business Systems Corp.
51 Joseph St.
Moonachie, NJ 07074
(201) 440-9300
List Price: $2,599 with 512K RAM, 1.2-Mbyte floppy disk drive, floppy/hard disk controller, MS-DOS 3.1, GW-BASIC.
In Short: The MBC 990 is a straightforward AT compatible with improved performance over the original because of a selectable 6- or 8-MHz clock speed. At $2,599, it is a reasonable alternative to the PC AT.

CIRCLE 440 ON READER SERVICE CARD

Screen Test Proves Bondwell's Undoing

PC FIRST LOOK

BY PAUL M. STAFFORD

"Bondwell? What's a Bondwell?" That's the first question most people ask when they see the Bondwell 8 laptop computer on my desk. The second: "Is it on?"

At $1,595, the 8-pound Bondwell 8 comes from obscure Hong Kong roots, but it has a fair mix of features: 512K bytes of RAM, a 3½-inch disk drive, a 300-bit-per-second modem, RGB and composite video output jacks, and serial and parallel ports. In addition to these, it may have the distinction of being the first laptop computer with a backlit LCD that is completely unreadable.

With the backlighting on, the characters are washed out and squashed together, and you can forget graphics because the contrast is so wiped out on this tiny, 8⅞- by 2⅞-inch screen that gray scales take on the appearance of something closer to mud scales. In other words, the screen is completely useless. With the backlighting off, it's worse.

Incomplete Keyboard

The Bondwell's keyboard has incompatibilities with a lot of PC software, such as incomplete implementation of the PgUp and PgDn functions. And the modem is fine, but it is not Hayes-compatible, so you'd better learn to like the communications software that is supplied with the laptop (a version of Ward Christensen's CP/M Modem8 patched to run on the Bondwell).

It's unfortunate that this machine has so many flaws to go with its complement of appealing features. With a weight of 8 pounds and measuring 12 by 10¼ by 3 inches, it's about as small as PC-DOS laptops come, is sturdily built, and runs for a long time on its rechargeable batteries. There might be applications for which a computer such as the Bondwell 8 would be perfect—if you could just read the screen.

The $1,595 Bondwell 8 is loaded with features, but the screen is hard to read whether the backlighting is on or off.

PC MAGAZINE FACT FILE

Bondwell 8
Bondwell Inc.
3300 Seldon Ct., #10
Fremont, CA 94539
(415) 490-4300
List Price: $1,595
In Short: If the screen was readable, the keyboard was complete, and the communications software was better, the Bondwell 8 would be a nice machine for the money.

CIRCLE 441 ON READER SERVICE CARD

Photographs: Thom O'Connor

■ PC UPDATE ■ CHRISTOPHER JOHNSTON

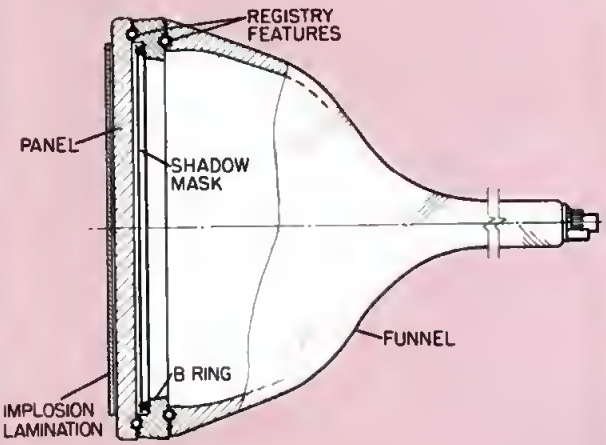
Austin, Tex.–based PC's Limited cut the price of its **PC's Limited AT** by 26 percent at the end of May, to $1,495, for an 8-MHz machine with 1,024K bytes of RAM, a keyboard, and a 1.2-megabyte floppy disk drive. It had been $1,995 since its September 1985 introduction. Noting that component prices have been steadily falling, PC's Limited president Michael Dell says he expects higher sales volume to compensate at least in part for the price cut. IBM cut prices of its **PC AT**s up to 12 percent on April 2, but the entry-level AT remained unchanged at $3,995 with a 6-MHz processor and 256K bytes of RAM.

* * * * *

Big Blue has entered the professional publishing world with **IBM Books**, a new department in the corporation's North Central Marketing Division. IBM Books plans to publish up to 20 titles a year, written by both IBM authors and outsiders. The six topics expected this fall to spearhead the venture include portable computing, networking, business graphics, word processing, computer maintenance, and a dictionary of computer terms. Random House will distribute the IBM titles to bookstores and retail outlets across the U.S. and Canada. IBM spokesperson Linda Nardin notes that publishing is not new to IBM, citing the plethora of IBM technical-reference and special-interest manuals produced by the company. "IBM is looked upon as the authority on computers, but you wouldn't see IBM books at your corner bookstore. Now we're entering the retail market."

* * * * *

Computer screens soon may be flat, not rounded, if San Diego, Calif.-based Zenith Electronics' new **"flat tension mask" screen tube** technology finds a following. A Zenith spokesperson says the FTM tube beats conventional displays by as much as 80 percent in brightness and as much as 70 percent in increased contrast ratio, and the faceplate is perfectly flat and nearly reflection-free. When will you see a monitor with the FTM technology? Zenith plans to ship the first tubes by early 1987. The company also plans to license the technology to Zenith Data Systems and other monitor manufacturers.



Zenith says its new 14-inch color picture tube with "flat tension mask" technology offers increased brightness and contrast with little or no glare. Its cost is only marginally higher than that of existing tubes. The new FTM tube will be on monitors by 1987, according to a company spokesperson.

* * * * *

A new version of ***SAVE OUR SPREADSHEET (SOS)*** from Goldata of Bryn Mawr, Pa., now works with ***1-2-3***, Release 2. *SOS* is a 3K-byte memory-resident utility that backs up *1-2-3* files at timed intervals. Goldata plans to support ***Symphony*** and ***Framework*** in future releases. *SOS* is $29.95, or free for registered users from Goldata Computer Services Inc., 2 Bryn Mawr Ave., Bryn Mawr, PA 19010; (800) 432-3267.

* * * * *

Version 3.0 of ***PC-Key-Draw*** adds a novice mode and mouse support and increases available functions by 60 percent, including polygons and spirals. *PC-Key-Draw* is a design, paint, and slide-show program available on public bulletin boards. With manual and technical support, it's $100 from Oedware, P.O. Box 595, Columbia, MD 21045; (301) 997-9333.

* * * * *

Lotus is selling a ***Personal Engineering Resource Directory***—a quarterly catalogue that lists ancillary ***1-2-3*** products. The directory is $4.95 from Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, MA 02142; (617) 577-8500.

* * * * *

Volkswriter 3 from Lifetree Software of Monterey, Calif., has been released in 3½-inch disk format for laptops, including the **IBM PC Convertible**. Upgrades are $50.

* * * * *

Hoping to spur add-on development, Living Videotext of Mountain View, Calif., released ***ThinkTank***'s file format to the public domain. The *ThinkTank* database format had been proprietary, but Living VideoText has now announced details on how to extract and input information in *ThinkTank*-compatible format.

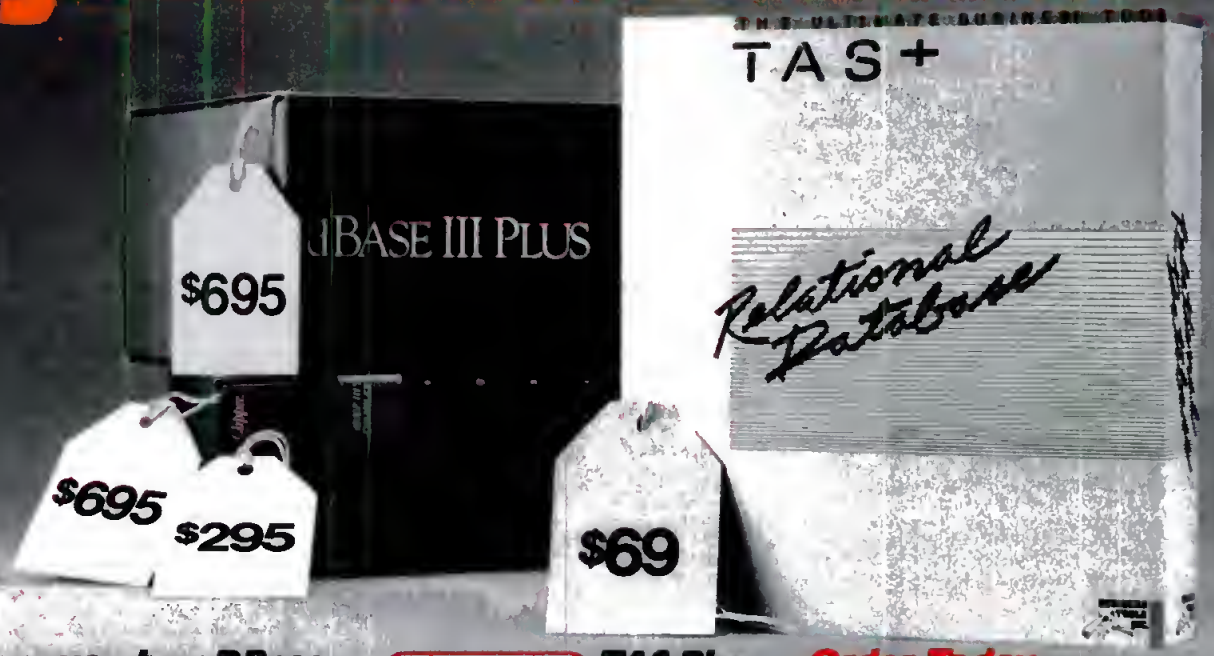
* * * * *

While computer prices fall, the cost of Japanese peripherals is rising with the value of the yen. NEC Information Systems hiked prices about 5 percent on some dot matrix printers. The **Pinwriter P560** increased from $1,445 to $1,495; the **P565** from $1,560 to $1,625. The **P6** line was unchanged. The **P760** rose from $899 to $995; the **P765** from $975 to $1,075. The **Spinwriter** letter-quality printer line was unchanged. One printer, the **P560XL**, was reduced from $1,725 to $1,695.

* * * * *

In brief: Fujitsu America now supports the IBM Proprinter command set for its model **DX2100** and **DX2200** dot matrix printers...CompuVision International upgraded ***Giraph Business Graphics***, Version 6.0, to support networks...Vasco announced Version 1.3 of its ***Concurrent Authoring System***, as well as a new on-line DOS help utility called ***QuickRef***...Watcom Products from Waterloo, Ontario, released ***WATFILE/Plus***, an upgrade of its data-manipulation system...Hercules Computer Technology of Berkeley, Calif., will rebate $50 to purchasers of its Graphics or color cards through August 31...Ungermann-Bass's **Net/One PC** network now supports Novell's **Advanced NetWare** operating system, Version 1.02 and 2.0...CMI Software in Waltham, Mass., has announced Version 2.2 of ***Techwriter***, its scientific word processing system...***Instant Recall*** from Precept of Palo Alto, Calif., a memory-resident database, is now available as shareware (suggested contribution $10) on CompuServe and some electronic bulletin board systems around the country ... Cheetah International of Longview, Tex., will bundle a copy of ***Microsoft Windows*** with each of its **Cheetah Card** and **Cheetah Combo** card memory boards...Birmingham, Mich.–based Compuware Corp. has released ***PowerBase***, Version 2.2, which is said to be 20 percent faster than the previous version ... AST Research and Zenographics, both of Irvine, Calif., have agreed to bundle Zenographics' ***Autumn*** and ***Mirage*** graphics packages with AST's new **AST-3G EGA**...Interface Technologies Corp. of Houston is shipping Version 2C of ***Farsight***, a ***1-2-3*** lookalike.

The price of power just went down.



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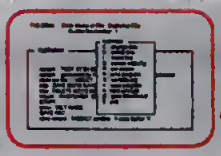

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CIRCLE 472 ON READER SERVICE CARD

SmartNotes: Like Electronic Post-Its

PC FIRST LOOK

BY RICHARD AARONS

Someday you'll own *SmartNotes*. It's one of those utilities that, like *The Norton Utilities*, *ProKey*, or *SideKick*, finds its way onto seriously used personal computers.

SmartNotes is an ingenious $79.95 memory-resident program that lets you "stick" notes onto any type of program displayed on your screen—word processor, database, spreadsheet, or source code. The notes appear when the screen is recalled, yet the notes never affect the annotated file. It's similar in function to Turner-Hall's $79.95 *Note-It* (*PC Magazine*, Volume 5 Number 11), which works only on Lotus's *1-2-3*.

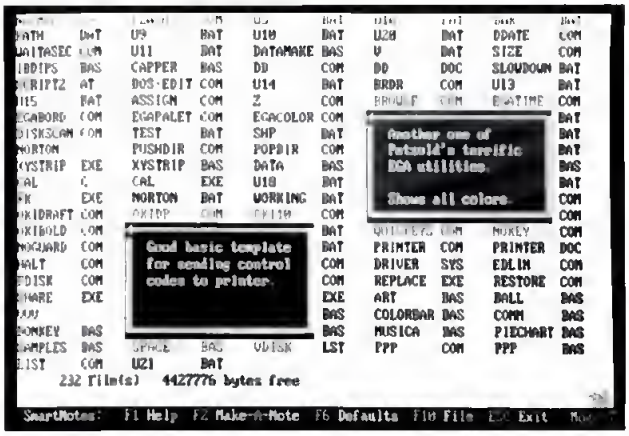
You can view the computer screen with notes showing or notes hidden. There are two note sizes and a selection of five note colors. Notes can be printed or even transferred in files to other *SmartNotes* users either on disk or over telecommunications lines.

"Electronic Glue"

Personics president Marc D. Peterson explained *SmartNotes* this way: "Personics has invented a special 'electronic glue' to bind notes to computer documents. The basis for the glue is ultrafast pattern matching. When a note is attached to the computer screen, the *SmartNotes* program records the context in which the note was placed. When the user invokes *SmartNotes*, the program scans the patterns of words and numbers on the screen and compares those patterns with each recorded context. When a match is found, a note pops up."

Personics' "glue" is a proprietary pattern-matching technology. Working like a search-and-replace function on a word processor, it searches and overlays the screen with a box containing the note. The context it searches for is normally the 47 preceding characters in a text environment; however, you can change the context when necessary to provide more-valid notations. For example, the context can be limited to just enough characters to scan a single database field so that a note would appear in a box on the screen whenever a given name appeared in a listing.

The context in spreadsheets is usually a relative cell location, so that you can safely change column widths, insert and delete rows and columns, or move ranges.



SmartNotes ($79.95) ingeniously attaches pop-up notes to almost any program or even DOS directories without affecting the programs or data files.

Varied Applications

PC Magazine tried *SmartNotes* on an IBM PC AT to put notes on *KnowledgeMan* listings, *Framework* telecommunications applications, *WordPerfect* text, and DOS 3.1 directories. In all cases the notes were easily crafted and recalled. In no case did the note interrupt the host file or screen. On the AT, file scan time was not observable.

SmartNotes has been tested with Lotus's *1-2-3* (1A and 2), *Symphony*, *Multiplan*, *WordStar*, *MultiMate*, *dBASE*, and *SideKick*.

It unfortunately does not operate with computer games and other programs that are highly graphics-oriented.

PC MAGAZINE FACT FILE

SmartNotes
Personics Corp.
2352 Main St., Bldg. 2
Concord, MA 01742
(617) 897-1575
List Price: $79.95
Requires: 90K RAM in addition to DOS and other programs. Most useful when run on machines with 256K RAM or more.
In Short: Memory-resident utility that enables you to annotate any screen or file, much as you would use Post-Its on paper. Similar to *Note-It*, but not limited to *1-2-3*. Not copy protected.

CIRCLE 424 ON READER SERVICE CARD

Uncle Sam's Micro Available for $1,254

BY FRANK J. DERFLER, JR.

One of the winners in the Air Force–Navy competition to select standard microcomputers for the military is available to the employees of local, state, or federal governments at the same volume prices the military pays—$1,254. While the bulk of the awards went to Zenith, the award for a transportable was made to an experienced government systems integrator named Federal Data Corp., which is supplying a unique 24-pound system made by TeleVideo. The contract includes a Chinese menu of peripherals, software, and options, ranging from a $600 20-megabyte hard disk drive to a $350 copy of *Enable*.

The TeleVideo XL is a rugged, transportable PC with two floppy disk drives, 256K bytes of RAM, serial and parallel ports, four open slots, a 9-inch CRT and color video interface, a padded carrying case, and a 180-day warranty. The system passed extensive performance and compatibility tests conducted by the U.S. Navy and Air Force. Measuring 15 inches wide and 14 inches deep, this machine is one of the smallest CRT-equipped PCs on the market, yet the 9-inch screen is big enough for full-time use without discomfort.

The government contract includes an external XEBEC 20-megabyte hard disk for $849 and an Insider 20-megabyte hard disk for $610. Printers, modems, and software are similarly discounted. Through a special arrangement with a company called Government Employees Association (which also discounts cars and insurance), Federal Data makes all the contract items available at the same prices to anyone employed by a local, state, or federal government agency. The address is Box 2405, Arlington, VA 22202.

Photograph: Thom O'Connor

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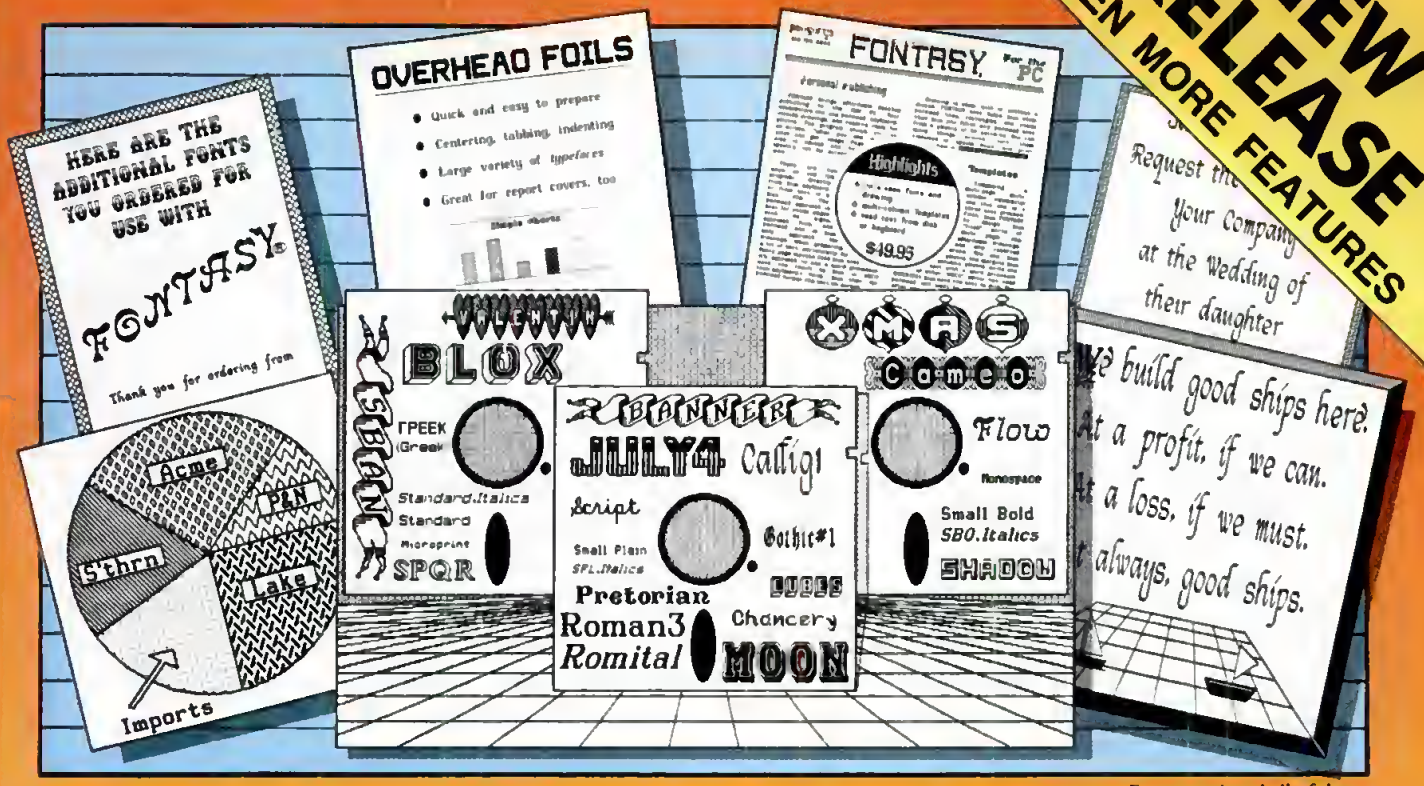

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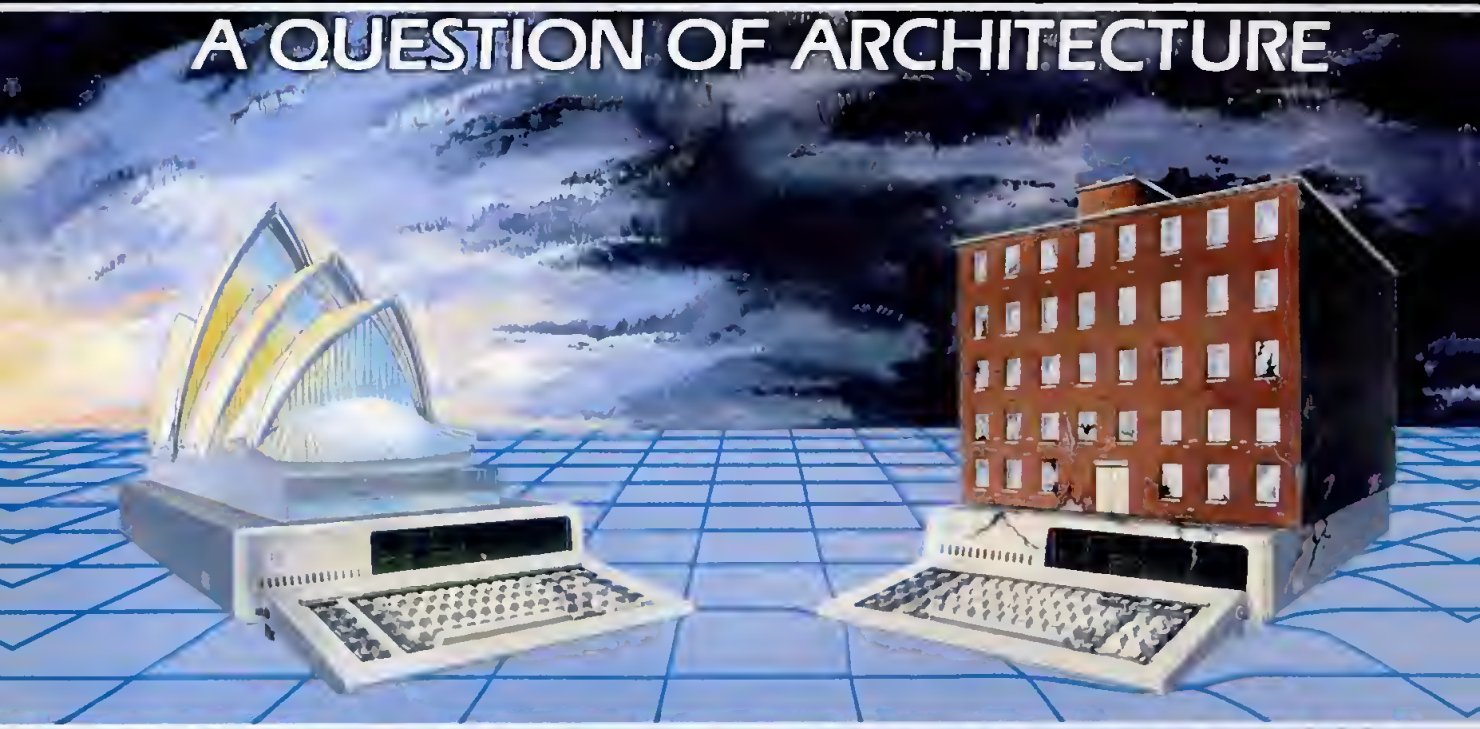
QNX vs UNIX

A QUESTION OF ARCHITECTURE



What do QNX and UNIX have to do with architectural design?

The design determines the environment in which you and your applications must survive. If the shear weight of the UNIX operating system brings the PC to its knees, all applications running under it will suffer. Unix was conceived more than a decade and a half ago and the product today is the result of modifications, additions and patches by hundreds of programmers. The result is a large and convoluted piece of software which needs the resources of an AT or more.

QNX's superb performance and compact size is the result of one dedicated design team with a common purpose, and complete understanding of both the software and the environment in which it must run. It runs quickly and efficiently on PC's and soars on an AT. Unlike Unix, QNX is capable of real time performance and is the undisputed choice for real time process control, and office systems. You can buy an OS that offers you a 1 to 3 user dead end on an AT, OR, you can consider QNX which allows you anywhere from 1 to 10 users on both PC's and AT's. And we don't stop there. Unlike other Unix-type systems for PC's, QNX is also a networked operating system. Not a patch-on network, but a fully integrated networking system for up to 255 micros. QNX allows you to start with a single machine and grow if and as required. There are no dedicated file servers and you can attach terminals (users) to any machine. To choose a solution which ignores networking, is closing the door on your future.

Everyone is talking about Unix like systems, but no one wants to abandon the tremendous amount of DOS software available. QNX does not force you to make that decision. You can run either PC DOS 2.1 or 3.1™ as one of QNX's many tasks. (DOS File compatibility and DOS development tools are also available). Don't misunderstand us. We at Quantum have a great deal of respect for Unix. It was a major force in moving operating systems out of the 1960's and into the 70's. QNX however, was designed in the 80's and will be a driving force of the 1990's. **Over 20,000 systems have been sold since 1982.**

Quantum strongly believes that there are good reasons for buying QNX, DOS and Unix. If you want more than DOS and a working alternative to PC Unix, give us a call and we will discuss your needs.

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Interlude II

MATA HARI–Interlude #156

What time does your flight arrive?

Oh, are you picking me up?

Look for a tall brunette in a trenchcoat…and nothing else.

Ah, you've been playing Interlude again!

Right.

Maybe I can catch an earlier flight.

Please do.

Interlude II. The long-awaited sequel to the first adult computer game in history is finally here. It's provocative and playfull Outrageous and romantic! It has all the excitement of the original Interlude, plus significant new features.

The computerized-interview, which is taken by one or both players, has been greatly expanded. It probes your innermost desires to discern your mood of the moment, your secret longings, your special fantasies, and then suggests for your pleasure one of its more than 160 Interludes. You can ask the computer for an Interlude for now, or one for later. Special options give each player added control over surprises and special erotica hidden in the Interludes.

The original Interlude took the computer world by storm six years ago, creating a media sensation:

FORUM Magazine: *"The Interludes are imaginatively and sensitively written… the computer's recommendations are uncannily appropriate."*

US Magazine: *"The most edifying third party to join couples between the sheets since The Joy of Sex."*

Chicago Tribune: *"This marriage of computer technology and sex is natural… erases forever the image of computer-users as dull guys with slide rules in their pockets and square roots on their minds."*

Money Magazine: *"Sometimes it's easier to tell a computer what you want than it is to tell your partner."*

Interlude II will take you to the outer limits of fantasy and romance. And, if the computer selects Interlude #99 your love life may never again be the same.

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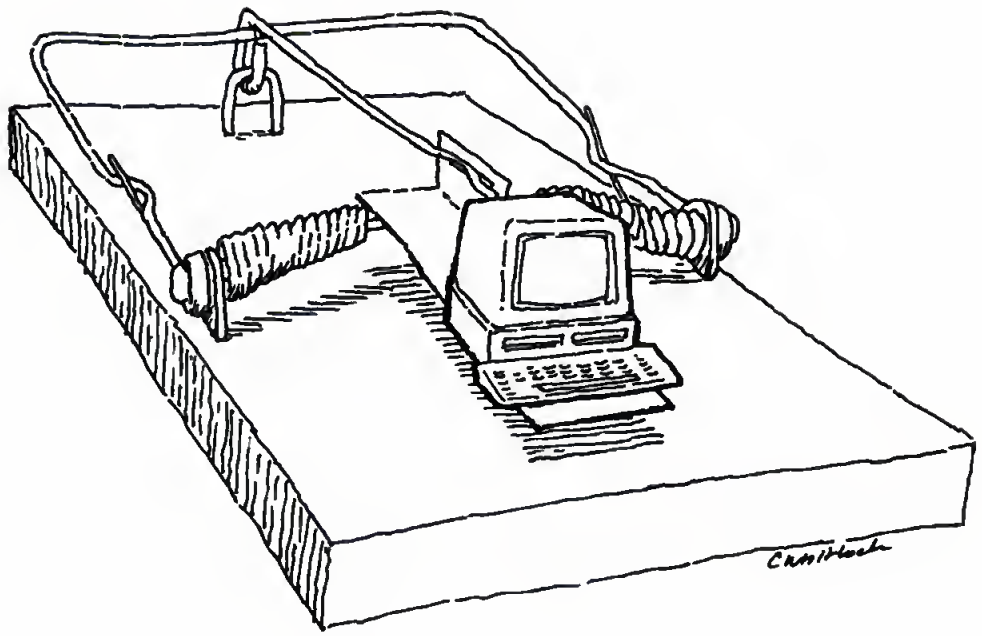

What can you expect for $1000?

As prices for PC-competibles come down, your chances of buying a lemon go up. The fect is, a lot of seeming bargains can turn out to be expensiva traps.

That's not to say a reliable, fuil-featured PC for $1000 is impossible to find. You just heve to know where to look. And what to look for.

At PC Designs, we've built a reputetion of knowing where to look for tha finest, most relieble components end offering them in easy-to-assemble kits. The result has always been higber performence et a lower price.

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We cell our new XT-competible Tha Plein Vanilla . . . an honest computer at an honest price. But don't be fooled by tbe name—or the price. The Plain Vanilla outperforms any other computer in its price range, end some costing a lot more.

Listen to what Paul Bonner of PC Week had to say ebout The Plain Venille: ". . . et $995, The Plain Vanilla represents an incredible bargain for a standard XT-competible."

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Pure Performance

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Actuelly, there's a lot more. Like a built-in clock/calendar with battery beck-up, support for an optional 8087 math co-processor, RAM disk software, a print spooler (along with severel useful public domain progrems) and a hinged, metal XT-style case with six expension slots.

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As with ell PC Designs products, The Plein Vanilla comes to you complete (a lot of PCs et this price are just skeletons—you have to add a monitor or e keyboard or a graphics board or . . . you get the idea).

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CIRCLE 373 ON READER SERVICE CARD

■ NEW ON THE MARKET ■ PAUL M. STAFFORD

Laptopp Systems' $149.95 On-The-Go thermal printer weighs 2½ pounds, including four C batteries.

Symphony and 1-2-3 Add-ons Extend Spreadsheet Functions

Two recently introduced aftermarket products claim to extend the range of *1-2-3*'s and *Symphony*'s capabilities.

What'sBest! Personal Version, $149 from General Optimization, lets users find the best-possible solutions for small spreadsheets of up to 800 cells by manipulating up to 250 variable cells. For a review of *What'sBest! Commercial* and *Professional* versions, see "*What'sBest!* Adds More Clout to *1-2-3*," page 36.

Users can later upgrade to the *Commercial* ($695) or *Professional* ($995) versions for the difference in price, plus a $25 handling fee.

INTEK Solutions' $149 *XYZ:Spread* extends *1-2-3* and *Symphony* spreadsheets beyond the two-dimensional *xy* plane by letting users move data ranges between different spreadsheets. *XYZ:Spread* works with files created by any combination of any version of either *1-2-3* or *Symphony*.

List Price: *What'sBest! Personal Version*, $149. **Requires:** 256K RAM, DOS 2.0 or later. **General Optimization Inc.**, 2251 N. Geneva Ter., Chicago, IL 60614; (312) 248-7300.

CIRCLE **426** ON READER SERVICE CARD

List Price: *XYZ:Spread*, $149. **Requires:** 256K RAM, DOS 2.0 or later. **INTEK Solutions Inc.**, 568 Washington St., Wellesley, MA 02181; (617) 431-1063.

CIRCLE **427** ON READER SERVICE CARD

Laptopp Systems Thermal Printer Weighs 2½ Pounds, Runs on Batteries

Laptop computer users now have another tiny printer to carry on the road. Laptopp Systems' $149.95 On-The-Go printer weighs 2½ pounds, including four C batteries, and is Epson MX-80 compatible. Laptopp Systems claims a 40-character-per-second print speed printing 7- by 9-dot characters.

List Price: On-The-Go, $149.95. **Laptopp Systems Inc.**, 515 Calle San Pablo, Camarillo, CA 93010; (800) LAPTOPP; (805) 482-9699.

CIRCLE **434** ON READER SERVICE CARD

HOT PROSPECT

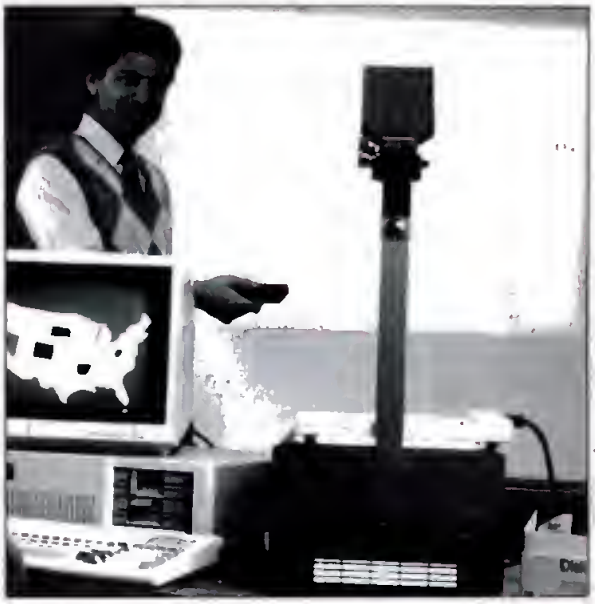
Kodak Projects Bright Future for Overhead Computer-Image System

A new medium for educational and business presentations has emerged. The System 10, developed and manufactured by Sayett Technology and marketed by Kodak, is a combined software/hardware system that creates, stores, and lets you display CGA 640- by 200-pixel text and graphic images through a standard overhead projector. Weighing less than 4 pounds, the hardware element of the 12- by 12- by 2-inch System 10 is an LCD panel that sits on the glass of the transparency projector. The System 10's software accepts images from any text or graphics-based software. Display options include random image selection; forward, reverse, and sequential display; split-screen imaging; an on-screen pointer, and highlighting—any of which can be controlled from either a control panel on the LCD or from a hand-held infrared remote-control unit.

The System 10 converts color images to monochrome; Sayett is working on a color version.

List Price: System 10, under $1,300 (exact price was unavailable at press time). Eastman Kodak Co., 343 State St., Rochester, NY 14650; (716) 724-3169.

CIRCLE **425** ON READER SERVICE CARD



Kodak's less-than-$1,300 System 10 overhead projection system lets users display images created by their PC software through an overhead transparency projector.

Company Claims Accurate Binary Transfer on Its Electronic-Mail Service

SPEED>S electronic delivery service allows users to transfer binary data, including spreadsheet and data files and executable code, using the Microcom Network Protocol (MNP) to ensure accuracy. The service can be reached through a local call from over 500 U.S. cities. It requires SPEED>S communications software with MNP.

List Price: $50 per package; $30 each for two or more; 12 cents per K byte of data for 100K bytes or less; 7 cents per K byte for more than 100K. **Requires:** 256K RAM. **Gimcrax Inc.**, 430 First Ave. North, Minneapolis, MN 55401-1713; (612) 341-0920.

CIRCLE **432** ON READER SERVICE CARD

Texas Instruments Laser Printer Series Targets High-End Laser Market

Texas Instruments has announced a series of three high-end laser printers that each use a Ricoh print engine. The $5,995 OmniLaser 2015 is aimed at high-volume and shared-resource environments; it prints 300-dot-per-inch text at 15 pages per minute and has a maximum duty cycle of 25,000 pages per month. It features 512K bytes of RAM and two slots for plug-in print modules. The $7,995 OmniLaser 2115 is TI's high-volume and shared-graphics entry; it also prints at 15 ppm and features a controller for Adobe Systems' PostScript laser graphics language, including a Motorola 68000 micro-

VersaCAD 3-D Module Adds True Three-Dimensional CAD Capabilities to the PC

T & W Systems' $495 *VersaCAD 3D* is an add-on module to its *VersoCAD Advanced* 5.0 system. *VersoCAD 3D* does three-dimensional surface modeling, which includes up to 16 decimal digits of accuracy, implements primitives (such as cones, cylinders, spheres, and boxes), and lets users rotate primitives around the *x*, *y*, and *z* axes.

List Price: *VersaCAD 3D* $495. **Requires:** *VersaCAD Advanced* 5.0 system. **T & W Systems Inc.**, 7372 Prince Dr., #106, Huntington Beach, CA 92647; (714) 847-9960.

CIRCLE **428** ON READER SERVICE CARD

Everex, CPU Controller Cards Handle Multiple PC Floppy, Hard Disk Drives

Multiple drive adapters have been available for a while on the AT, but these two cards let you double up and save slots on a PC or XT.

CPU's $75 Ten of Spades board controls two floppy disk drives, one or both of which can be quad-density drives. The Ten of Spades fits into the XT's short slot, further cutting down on space consumption.

Everex Systems' $299 EV-390 is a full-length card that can control one or two hard disk drives and up to four floppy disk drives, any of which can be internal or external to the PC.

List Price: Ten of Spades, $75. **CPU Electronics Systems Inc.**, 2652 Slough St., Mississauga, Ontario, L4T 3T2, Canada; (416) 673-7355.

CIRCLE **433** ON READER SERVICE CARD

List Price: EV-390, $299. **Everex Systems Inc.**, 48431 Milmont Dr., Fremont, CA 94539; (415) 498-1111.

CIRCLE **438** ON READER SERVICE CARD

Instant Replay, Showcase Create Interactive Demos, Presentations, Tutorials

One major problem for software marketers is demonstrating complex software packages to prospective customers. Both Nostradamus's $89.95 *Instant Replay* and RMS Technology's $135 *Showcase* can memorize keystrokes, paint screens, design menus, and then play back the entire application as a presentation, product demo, or interactive tutorial. *Instant Replay* can run programs from DOS and can control details like timing between keystrokes. *Showcase* can insert user-defined color graphics windows into presentations.

List Price: *Instant Replay*, $89.95. **Requires:** 128K RAM. **Nostradamus Inc.**, 5320 S. 900 East, #110, Salt Lake City, UT 84117-7202; (801) 261-0769.

CIRCLE **430** ON READER SERVICE CARD

List Price: *Showcase*, $135. **Requires:** 128K RAM. **RMS Technology Inc.**, 9680 S. Gribble Rd., Canby, OR 97013; (503) 829-9830; (503) 226-7688.

CIRCLE **431** ON READER SERVICE CARD

New Data General Laptop Features Enhanced Screen, 10-Megabyte Hard Disk

Users looking for a PC-compatible laptop computer with a readable screen display should be pleased with the Data General/One Model 2. Weighing less than 12 pounds, the DG/One Model 2 features a choice of an enhanced nonilluminated LCD ($2,995 with 256K bytes, one 3½-inch floppy, and one hard disk drive) and electroluminescent ($3,995 for the same configuration) screens. Both screens display text and graphics in the same aspect ratio as a standard 12-inch monitor, so pie graphs don't take on the football shape that they do on most laptop screens (including IBM's).

The $3,995 DG/One Model 2-EL features an electroluminescent screen display plus one floppy and one 10-megabyte hard disk drive.

In a press preview, the nonilluminated Model 2 screen appeared to have noticeably better contrast than the earlier version it supersedes.

List Price: Model 2-LCD with one floppy disk drive and 10-megabyte hard disk drive, $2,995; Model 2-EL with same configuration, $3,995. **Data General Corp.**, 4400 Computer Dr., Westboro, MA 01580; (617) 366-8911.

CIRCLE **435** ON READER SERVICE CARD

RAM-Resident Program Opens Multiple Notepad Windows On-Screen

Tornodo Notes from Micro Logic Corp. is a memory-resident notepad utility that lets you open multiple notepads on-screen at the same time. *Tornodo Notes* handles notes by content instead of by filenames. All data is held in one DOS file; users search for strings using And/Or/Not operators, so as many notes as can fit in RAM may be opened at the same time. The *Tornodo Notes* program includes an import/export facility and lets users edit, merge, and duplicate notes.

List Price: *Tarnado Notes*, 49.95. **Requires:** 50K RAM. **Micro Logic Corp.**, 100 2nd St., Hackensack, NJ 07602; (201) 342-6518.

CIRCLE **437** ON READER SERVICE CARD

Samna Decision Graphics Draws from Numbers

Somna Decision Graphics system creates more than 15 different types of graphs from any type of numerical data, including spreadsheet files. *Somno Decision Graphics* has mathematical and macro capabilities, letting business users manipulate data and automate tasks.

List Price: *Samna Decision Graphics*, $450. **Requires:** 320K RAM. **Samna Corp.**, 2700 NE Expwy., Atlanta, GA 30345; (404) 321-5006.

CIRCLE **429** ON READER SERVICE CARD

processor and 3 megabytes of RAM. The $5,995 OmniLaser 2108 has an 8-ppm print engine, a 68000 PostScript controller, and 2 megabytes of RAM.

List Price: OmniLaser 2015, $5,995; OmniLaser 2115, $7,995; OmniLaser 2108, $5,995. **Texas Instruments Inc.**, P.O. Box 2909, Austin, TX 78769; (512) 250-7111.

CIRCLE **436** ON READER SERVICE CARD

Texas Instruments' OmniLaser series (from left to right): OmniLaser 2015, $5,995; OmniLaser 2108, $5,995; and OmniLaser 2115, $7,995.

This is Great! - Hear there is a new version now. only 39.95 +5/handling

OK TO ORDER

REPRINTED FROM
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SEPTEMBER 10, 1985
VOL. 2 NO. 36
THE NATIONAL NEWSPAPER OF IBM STANDARD MICROCOMPUTING

now we can easily manage 100 of our applications

'PathMinder' Tool Handy for Making Hard Disks Easier

Our penchant for categorizing things, from music to politicians to social positions, carries over into our perception of software.

That's one of the reasons software publishers bemoan what they like to call "the bottleneck at retail": It's tough to get a new program in an established category onto the market, nearly impossible to get a new kind of program on the shelves.

Because sheep-like, we follow the same ruts across the pasture to the old, familiar stuff.

That preference for sorting programs out into too few and usually ill-defined categories has meant we've seen a slew of often very different utilities lumped together into the "disk manager" and "DOS command shell" slots.

The market's perception (or misperception) of a program's natural habitat leads to confusion for buyers, and also means a few exceptional programs get buried under lesser but market-leading competitors to whom they're only distantly related.

Jim Seymour writes the syndicated newspaper column, "MicroBusiness," and helps corporate clients keep their microcomputer users happy.

Finding a Winner

PathMinder, from Westlake Data, is a perfect example of such a winner—a power tool far better than anything like it on the market, but one which suffered from being second (or maybe fifth or eighth) of its kind to market. On the surface it looks like a DOS command shell; in practice, it's a sophisticated disk manager, a nearly indispensable tool for hard-disk users.

Bourbaki's *Idir* was the first "disk manager" utility I saw, and it was and remains a good product. But *Idir* suffers from a problem I find almost universal among command shells. After a while, you begin find it tiring, and eventually find you don't use it much any more.

By contrast, *PathMinder* is so fast, convenient and useful that I use it constantly, and can no longer imagine trying to run a large-capacity hard disk without it. The program uses windows for lists of directories, subdirectories and files, and lets you move things among them quickly with a Lotus-like menu across the top of the screen. You can execute almost anything possible within the DOS command-set (except a single-step, copy-and-rename operation) by simply hitting the first letter of the English-language term for what you want to do.

Because it's memory-resident, *PathMinder* runs lightning fast, because it follows the DOS rules, it runs with almost anything you can put on a disk.

The program is full of nice touches. A very good screen-oriented editor lets you clean up .BATs and add new flourishes to your AUTOEXEC and CONFIG files without having to boot up your favorite plain-ASCII word processor or COPY CONning.

The .BAT-file copying and .BAT-file erasing capabilities of *PathMinder* are alone worth the price. You can erase groups of files, or move groups of files from any directory, on any disk, to any other—without playing Wildcard Roulette.

An encryption routine scrambles data very nicely. An applications-menu generator lets you hide *PathMinder* from the casual user, while delivering its power to his screen. A user log tracks who used the computer for what, how long and for whom.

I don't know DOS like the guys at Microsoft, but I don't have any trouble remembering how to CD, MD, DIR, TYPE and ASSIGN my way through sessions at the computer. But with rare exceptions, I still let *PathMinder* handle the dirty details of command syntax. And for those exceptions, I use *PathMinder*'s easy window-into-DOS facility to type in my more bizarre maneuvers.

Nothing's free, and while *PathMinder* only costs $95, it does take up memory, now down to about 70K bytes after a recent recompilation. That's 70K well-spent, I'd say —that, from someone who refuses to use a desk-accessories program and doesn't routinely load a macro program because he won't give up the memory.

You don't need a disk manager to survive close encounters of the hard-disk kind. But if you've never seen *PathMinder*, you owe it to yourself to take a look at the state of the art in Making Life Easier. ■

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new version has a visual tree display

can find a file and hide + reveal files too!

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they even added a print utility

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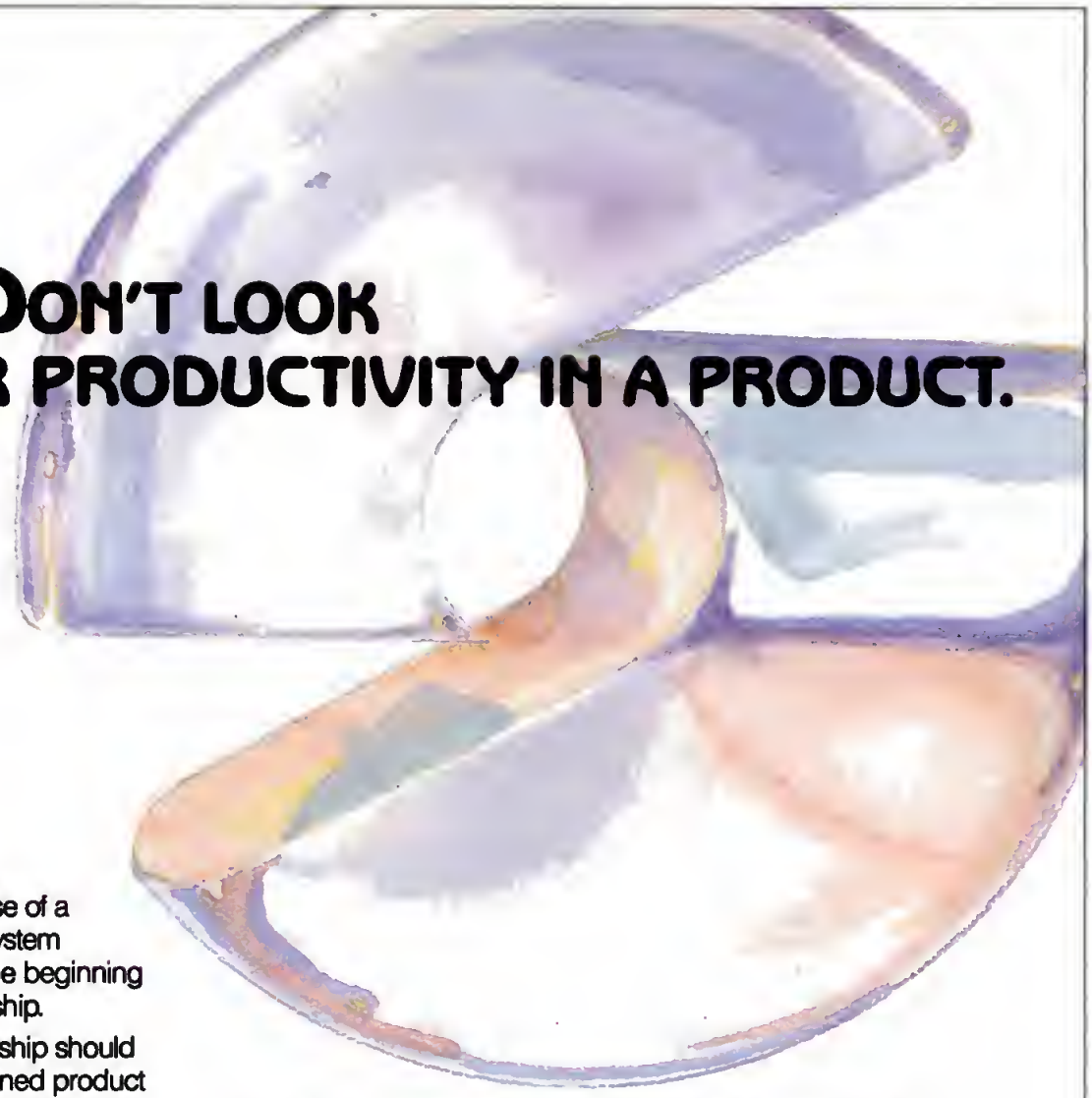

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Remote lets you run almost any program, from any location, as if you were there.

Remote is the software that turns your personal computer into a host computer. You or anyone you choose can dial it up from almost any terminal in almost any location, and run most popular application programs such as word processing, spreadsheets, and data base managers.

You'll see the program on your remote terminal screen as if you were seated at the host PC.

While Remote itself becomes transparent in use, it offers some very tangible benefits:

- You don't need a second PC to do the job of two. Almost any terminal or terminal emulator will do. The only software you need is the software in your host PC.
- Each of several different users can call in from anywhere in the world and use the host PC and software. Remote includes a sophisticated electronic mail system with encrypted messages and individual password protection.
- You can transfer files to and from the host computer, using the Crosstalk or XMODEM protocol.
- Programmers and software vendors can use Remote to debug a client's software by phone, without leaving their own offices.

Imagine the potential Remote has in extending the power of your own PC. Ask your dealer about it, or write for details.

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CIRCLE 326 ON READER SERVICE CARD

REMOTE™

MICROSTUF®

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No other video adapter revs up as much software, drives as many monitors, or fine tunes as many graphics.

STB Systems has just combined the technology of the industry's five most popular video display adapters: the IBM Color Graphics and Monochrome/Printer Adapters, the Hercules Graphics Card™, the Tseng UltraPAK-S™, and the STB Chauffeur™.

With the new Chauffeur HT™, the world's best graphics capabilities are at your service.

Roll through any software.

The Chauffeur HT lets you use any and all standard CGA or MGA compatible software. No preboot software or special drivers are needed.

Drive a fleet of monitors.

With The Chauffeur HT, you can emulate any color graphics software, producing 16 shades of gray on any IBM compatible monochrome monitor. CGA 200 line graphics modes are expanded to a full-screen format. Text is displayed as high resolution 8 X 14 characters.

The Chauffeur HT displays Hercules compatible software at 720 X 348; it provides a 1024 X 348 display mode for the CAD/CAM market, and a crisp 132 column display for spreadsheet and terminal emulation users.

Using any standard RGB color monitor or Enhanced Graphics display, you can produce monochrome quality text while maintaining high resolution, 16 color graphics. Even Hercules compatible software can be produced on enhanced monitors.

Enjoy the extras.

In addition to giving you greater graphics capabilities on a wider range of monitor types, with a wider selection of software,

The Chauffeur HT gives you a standard parallel printer port, an optional clock/calendar, a light pen interface support, PC Accelerator software, and full compatibility with the IBM PC, XT and AT.

	STB Chauffeur HT	STB Chauffeur	Tseng Labs UltraPAK-S	IBM Color Graphics Monitor	Hercules Graphics Card
COMPATIBLE MONITORS					
Enhanced Graphics Display	Yes				
RGB Color Display	Yes		Yes		
Monochrome Display	Yes	Yes		Yes	Yes
25 Khz Display	Yes				
GRAPHICS MODES					
IBM Monochrome Display	Yes	Yes		Yes	Yes
IBM CGA	Yes	Yes	Yes		
Hercules Monochrome Graphics	Yes			Yes	Yes
132 Column Display	Yes				Yes
OPTIONAL FEATURES					
Parallel Printer Port	Yes	Yes		Yes	Yes
Runs all CGA, MDA Hercules Compatible Software (no drivers required)	Yes				
Clock/Calendar	Optional	Optional			Yes

Honk for more information.

For detailed information on The Chauffeur HT, call or write STB Systems, Inc., 601 North Glenville, Richardson, Texas, 75081. (214) 234-8750. It's the only way to travel through tomorrow's graphics.

Meet The Chauffeur HT

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CIRCLE 517 ON READER SERVICE CARD

"...Sherman tank of hard disk drives."

-InfoWorld
July 22, 1985

HAVE A NICE INQUISITION, DEAR.

When Infoworld's contributing editor, Bernie Zilbergeld and the InfoWorld Review Board said they reviewed our ATplus20™ hard disk drive, we figured that they gave it the routine technical and performance diagnostics.

We didn't expect *destructive* testing.

They went after our legendary resistance to head-crashes with a vengeance.

HOW TO HENCH.

Mr. Z and his henchpersons began by subjecting the drive to 3,500 stops and starts.

Having survived this, our ATplus20™ drive then had to face increasingly severe physical torture *while* performing a seemingly relentless series of track seeking operations.

THINGS THAT GO BUMP IN THE DAY.

Further henching resulted in their bumping the table that the ATplus20™ was running on.

Then they *dropped* one side of the table from a height of six inches.

Next, the entire table was lifted one foot above the floor and dropped.

After cutting power to the drive (thus interrupting the seek test) they bumped the table severely, to see if the ATplus20's unconditional and automatic park and lock feature really makes a difference.

Then, they threw the book at us.

Actually, they dropped a rather heavy book *directly* on top of the drive itself.

GUESS WHAT?

You're absolutely right. CORE's ATplus20™ hard disk drive not only survived, but continued to perform as specified.

Each of the rather unnerving tests was repeated a number of times on the same drive, just to be extra sure.

Or mean.

THE LAWYER'S 2¢.

The tests were so nasty that they had to publish the following warning:

"We caution you not to perform any of these tests on your own equipment."

We have to agree.

These tests were done to determine the limits of the drive, and were intentionally extreme beyond the normal use environment.

SEAL OF APPROVAL.

We're delighted that InfoWorld tested, evaluated and *validated* exactly what we have been saying all along: *Now you can build the enhanced PC-AT that IBM didn't.*

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Along with the highest *reliability* among PC-AT compatible drives, we offer *full compatibility* with PC-DOS 3.0 and higher.

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Those users are delighted with our speed and performance.

PEACE OF MIND.

ATplus™ drives come with a full one-year warranty, supported by CORE and other major maintenance service companies.

Thus, we offer you a choice of on-site, local, or exchange maintenance services.

Known as CORE's Sudden Support™, all services are extendable to your entire AT system, and after the warranty runs out.

WE'LL BE AROUND.

We're the world's largest supplier of high-performance PC-AT compatible hard disk drives.

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■ COMMUNIQUES ■ EDITED BY BILL HOWARD

Next They'll Have a Space Shuttle Game

MicroProse Software updated *F-15 Strike Eagle* with a printed insert ($34.95) to help armchair pilots re-create the April 14 air raid against Libya.

MicroProse ends its print ads with "And the Best Part Is . . . No One Gets Hurt."

Scientists view surge in IBMs provocative

Reuters

WASHINGTON – A surge in production of accurate US infer-

Headline in the April 7 issue of the Boston Globe. *(The story was about ICBMs).*

Yet another mouse holder/cover: Mouse-Top from H&H Enterprises, P.O. Box 2672, Corono, CA 91718; (714) 737-1376. It's $5.95; $5.49 without glasses.

News **InfoWorld**

Corporate Hoards Unlikely at Comdex

By Priscilla M. Chabal
InfoWorld Staff

Microcomputer managers such as Tim Turnpaugh, senior vice president and manager of Technology Services at Seat-

at home because of a university travel funding policy that leaves her short of the $1,000 she needs for such an expedition, she said.

Even some microcomputer buyers who are close enough to the show to avoid the cost of air travel, hotel rooms, and meals don't plan to go themselves, although they may send some of their subordinates. Atlanta-based microcomputer manager

its proximity to the company.

Although micro managers are not discouraged from attending the show, neither are they encouraged, said The Interface Group product director Dave Thurman. "If they're interested in seeing products, the products will be here," he said. According to Thurman, some vendors appreciate the direct feedback that corporate users can supply.

Funny, the spelling checker never flogged it: Headline in the April 28 issue of InfoWorld.

Computer Comics

Over the winter, *PC Magazine* asked readers for the best jokes about computers.

We received a mixture that ranged from truly funny to truly sophomoric jokes, jokes poking fun at other professions recast as computer programmer/computer salesman jokes, and some that we couldn't even consider printing. One reader even sent in one of the sample jokes we printed in Issue 3. (Q: What's the difference between a computer salesman and a used-car salesman? A: The used-car salesman knows when he's lying to you.)

To the three winners go *PC Magazine* T-shirts and checks for $50.

Our favorite three:

Q: How many programmers does it take to change a light bulb?

A: None. It's a hardware problem.

Toys R Us was sold to IBM, which renamed the chain's stores Personal Productivity Centers.

Not to be outdone, Apple started its own toy store: Toys for the Rest of Us.

Q: How can you tell the new person in the word-processing pool?

A: By the Wite-out on the screen.

Then there were the funny-if-you're-still-in-high-school genre. Several of these came in written in pencil on ruled, three-ring binder paper. For instance:

Q: Did Dracula like computers?

A: Yes. It was love at first byte.

Q: What do you get when you cross a computer with a gorilla?

A: A hairy reasoner.

And the funny-but-we've-heard-them-before-in-different-guises jokes:

Programmers from Atari, Apple, and IBM, vacationing together in the French Caribbean islands, are arrested, tried, and convicted for a crime they did not commit—and sentenced to death by guillotine.

The IBM programmer is first up. The guillotine blade catches and stops 6 inches from his head. "I know your laws," the IBMer says, "and you only have one chance. I'm a free man."

The Apple programmer is next. The blade again snags, the Apple man invokes the same law, and he, too, is set free.

Finally, it's the Atari programmer's turn. The blade snags for a third time. The Atari man looks at the hung-up blade, turns to the executioner, and says, "Oh, I see what's wrong."

A man walks into a bar with an alligator on a chain. "You serve programmers in here?" he asks the bartender.

"Sure."

"Good. I'll have a beer." Pointing to the alligator, he adds, "He'll have a programmer."

Salesman: "I've got some software that will cut your workload in half."

Customer: "Great—I'll take two."

Heard anything odd or offbeat about PCs? Send it to: Communiqués, PC Magazine, *One Park Ave., New York, NY 10016; (212) 503-5293. We pay $50 for each item used (for similar items, earliest postmark wins). Contributors in this issue: Paul Pease, Lou Goddard, Paul Moneta, Malcolm Rubel, Jeffrey J. Schmitz, Marty and Judie Winston, Bert Whittier.*

Illustrations: Jon Weiman (air raid) and Heidi Kong (Wite-out)

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CIRCLE 170 ON READER SERVICE CARD

■ FROM THE EDITOR'S SCREEN ■ BILL MACHRONE

DESKTOP PUBLISHING: FACT OR FICTION?

People are hailing desktop publishing as a major technical breakthrough, the death knell for commercial printing. Is the hype real or manufactured?

Desktop publishing is about to surpass artificial intelligence as the phrase most bandied about the industry. Suddenly, everyone is talking about desktop publishing. Everyone has products in the works. Corporate user committees are studying the technology.

Well, folks, it's a hoax.

The single most innovative thing about desktop publishing is the name. It connotes simple systems that produce magnificent output with only the merest keystrokes. The words and images from your mind pause only briefly on the screen as they wing their electronic way to a laser printer, a phototypesetter, or an electronic page-composition system.

Another view would have you believe that desktop publishing is a new vocation, rapidly replacing typographers and printers. This couldn't be farther from the truth. If anything, what we call desktop publishing is probably creating more work for these people. Now that the output is beautiful, you want to lavish more attention on it than xerographic instant-printing.

To be sure, there is a shift in technology. Just as surely as Gutenberg ended a thousand years of monastic traditions, new hardware and software products are affecting layout and pasteup. There are no more Linotype operators, but they aren't dying from lead poisoning anymore, either.

Desktop publishing claims to ease the burden of creating good-looking output. But it's not magic. A talented designer will produce a better-looking page than a person with no aesthetic sense, whether or not he is using a computer. Most desktop publishing systems tout their ability to merge text and graphics and to create and edit graphic images. It's all too easy to forget that if you have no artistic talent you might as well be drawing with Crayolas. The same instrument is a scalpel if you're a surgeon, a knife to the average person, and a danger to yourself if you're a klutz.

REPEATING HISTORY Look at the history of American business: when quill pens were all the rage, there was a market for better grades of paper and inks that wouldn't smear. When typewriters trashed handwriting as an art form, they were only priming the market for electric typewriters. Manufacturers of dedicated word processors thought they had revolutionized the world, but they forgot to look behind them at the seemingly insignificant personal computers.

There has always been a market for anything that made putting the written word on paper faster or better looking. Stated a different way, we are all in the desktop publishing business. Always have been. Always will be.

Illustration: Ted Berner

A TECHNIQUE, NOT A MARKET Desktop publishing is not a vertical market. In fact, it isn't even a market. It's a technique. There is no product that shouldn't embody the advanced output control and page formatting that lies at the center of desktop publishing. And in the continuing tradition of WYSIWYG, products should show you exactly what you're going to get before you commit to print. Furthermore, every business application should be able to drive a page-composition machine.

It's unreasonable to expect each applications developer to build in drivers for sophisticated output devices such as phototypesetters and page composers. After all, most of them can't even handle the higher-end laser printers. There are two solutions to this problem: one is to concentrate on data-interchange standards. Then you can feed the output from your favorite application into page layout and design programs that show you on the screen how your output will look as a finished page. There are potential drawbacks to this approach: if the page layout program has editing capabilities, chances are you won't be able to go back to your original application if you change anything.

The other solution is an advanced operating environment, such as *Microsoft Windows* (here we go again). The whole point of such an environment is that applications

■ FROM THE EDITOR'S SCREEN

programs have no I/O drivers or even screen drivers. Applications programs talk to the operating environment, which talks to the hardware. That way, you need only one screen driver and one printer driver. The applications program can be blissfully unaware of the intricacies of driving these devices.

Blissful ignorance is a litmus test for the survival of products designed to aid and abet desktop publishing. The rate of change on the hardware side is so rapid and so unstandardized that no applications program has a chance of keeping up with progress. The task of creating the I/O drivers belongs with the device manufacturers, not the applications programmers.

THE FRITTER FACTOR Hardware and software considerations aside, there are dangers in desktop publishing. The biggest danger is what contributing editor Stephen Manes calls "the Fritter Factor." Today, most document creation is subspecialized into creation of words, creation of pictures, and design. Desktop publishing gives the word creator control over the other elements. That's fine if you have the ability, but do you have the time?

The entire direction of personal computing has been to put more power into the user's hands. Where executives used to assign their staffs to produce reports and analyses, they now do it themselves. Where authors were once done with a book when it was written, they now have utter control over its final appearance. At what cost? One of our contributing authors recently completed a book. It took him 6 months to write it, and he took another 6 months to get the formatting the way he liked it. Is this progress?

I remember an old Johnny Cash album, *Songs from Folsom Prison*. In front of a live audience, between songs, Johnny growls to a member of the backup band, "Here, tune this (bleeping) thing." Now that's delegation. Do you have the courage to do the same when an applications program entices you with endless formatting controls? Who's the singer? Who's the tuner? Your coworkers will surely be impressed by the appearance of your next presentation, but will your boss? Could it have been done even better by someone in the graphic arts department? Do they even have a PC?

Look at it another way: would you expect a graphic artist to do your job? Then why do you think you're qualified to do the artist's job?

The techniques underlying desktop publishing remain one of the most exciting and innovative areas in personal computing. But it has to work for you, not the other way around.

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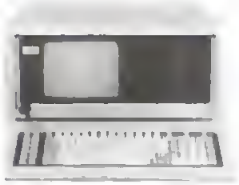

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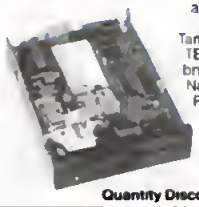

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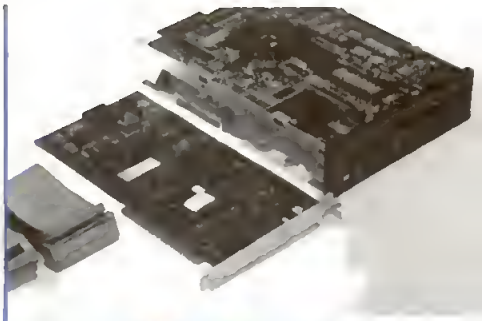

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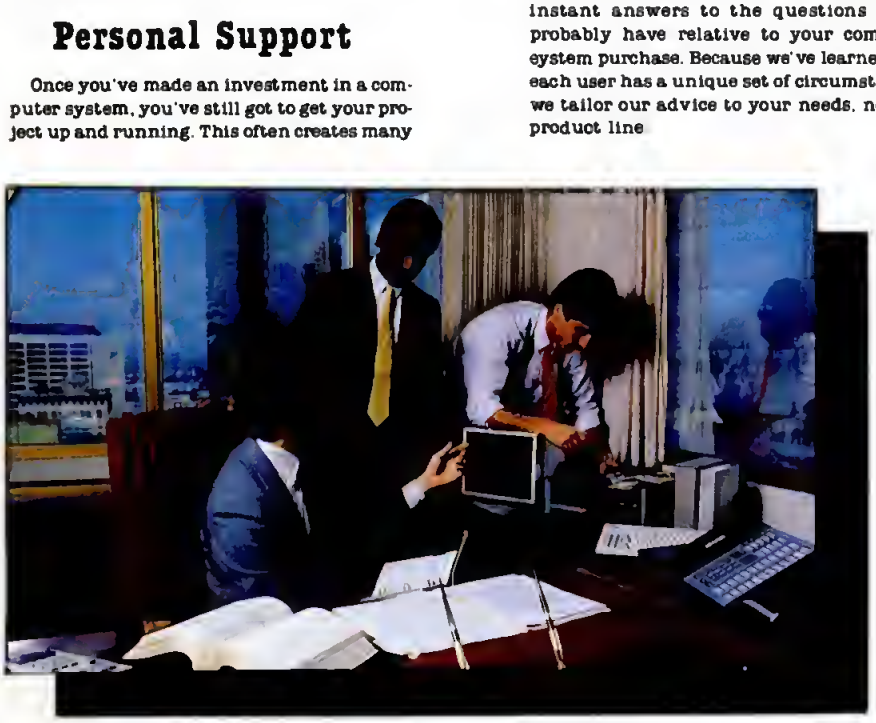

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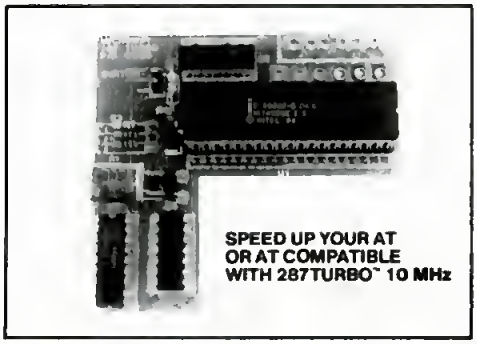

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■ PETER NORTON

DISPLAY SCREEN ISSUES

Norton muses about our perceptions of what really moves during page-downs and gives a first look at FlickerFree, a memory-resident program that solves screen problems.

An interesting thought about display screens and a fascinating new product for them have grabbed my attention lately.

Recently, reader William Perlis and *PC Magazine* editor Paul Somerson crossed swords in the Letters to PC Magazine column (*PC Magazine*, Volume 5 Number 6). It was interesting to see the sparks fly.

THE PSYCHOLOGY OF PGDN Like Paul, I thought that Dr. Perlis's theory that the page-down key (PgDn) should really be called down-page (DnPg) was wonderfully crackpot, but it brought up an issue in the psychology and human engineering of PC software that's worth discussing.

The issue is the relationship between the PC's video screen and the data that it displays and what happens, for example, when we press the PgDn key (or DnPg, if you will).

Imagine that you are working with a big spreadsheet or a big word-processing document, where only part of the data is shown on the screen at one time. To see other parts of the data, you have to move around. The tricky question is, what's the psychology? How do you conceptualize the process of moving data?

WHICH IS FIXED? There are two ways to think of the relationship between your screen and the data shown on it. You can think of your screen as being fixed, while the data moves, allowing you to see different portions as it does so. Or you can think of the data as being fixed, while the screen "moves" around to show different parts of the data. In the first case, pressing PgDn moves the data down so that new data is *above* what you saw before. In the second case, pressing PgDn shows us data *below* what you just saw.

You might think that it's the data that moves, not the screen; after all, we don't move and the screen doesn't move either. But psychologically, thinking of the screen as moving makes the most sense—it more closely approximates what we actually see and expect when we press the PgDn key.

THE OBJECTIVE HORIZON A pilot friend told me that the same thing applies to airplane instruments. There's a little gizmo in the aircraft cockpit called an artificial horizon that tells the pilot if the plane is tilted to the left or to the right. This instrument has two lines on it: one represents the airplane, the other the horizon. You'd think that this instrument would be oriented from the pilot's viewpoint (on the instrument, the line representing the airplane would be fixed, and the horizon line would tilt left or right), but it isn't. Instead, the instrument shows things (and here's the really amazing part) from the point of view of an outside observer watching the airplane in flight. When you look at the instrument, it shows the horizon straight across and the plane tilted, which is *not* what the pilot would see looking out the window.

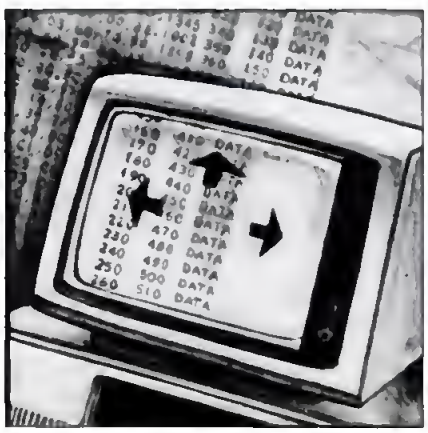

Illustration: Ted Berner

That concept is the key to understanding how the human mind perceives such things. As a general rule, we tend to visualize and conceptualize not from our own narrow, subjective position, but from what we sense intuitively is the objective viewpoint. I think it's closely related to children's innate sense of justice and fair play. There's something in the human mind that wants to see the world as objectively as possible, and that spills over to the way we work with machines. Pilots want their artificial-horizon instruments to show things from a "real world" point of view, not a pilot's-eye view, and that's also how we want to think about paging up and down through our data.

Of course, there isn't a "real" grid of data behind our PC's display screen the way there's a real horizon outside the aircraft, but it helps to think that way when you're dealing with the concept of PgUp and PgDn keys.

Dr. Perlis didn't quibble with the fact that most PC software works this way. He just claims that the term "page-down" describes the moving-data way of thinking, while "down-page" describes the mov-

■ PETER NORTON

ing-screen approach that nearly all programs use. My wife says that that's what happens when you're too smart or too educated for your own good, and gives me a knowing look.

FLICKERFREE If the Perlis-Somerson debate was the most fascinating thing I've read in a while, the most fascinating software I've seen for some time is a little goody called *FlickerFree*, being introduced by Steven Gibson.

FlickerFree is a memory-resident program that solves several problems that muck up display screens: snow, flicker, and lack of speed. The original IBM Color/Graphics Adapter was cursed with an ugly "snow" effect whenever programs wrote directly to the display memory (unless the programs used time-consuming desnowing operations). Fortunately, newer display adapters, such as Compaq's nifty built-in adapter, don't suffer from snow, but they do sometimes suffer from an even greater pain-in-the-eye: screen flickers when information is scrolled. And all the screens, even with the IBM monochrome adapter, often function much more slowly than they should.

■ You might think that it's the data that moves, not the screen; after all, we don't move and the screen doesn't either.

Gibson's *FlickerFree* is designed to solve these problems. Consider what it does with screen speed. One simple way to test a display screen's operating speed is to copy a big text file to the screen (using the TYPE command, or a command such as COPY FILE CON1) and time how long it takes. I tried a 3,500-line, 130K-byte file on my monochrome system. Without *FlickerFree* it took 101 seconds; with it, 36 seconds—over two and a half times as fast. A similar test on a Compaq 286, with its CGA-compatible adapter, speeded up the process by one and a half to two times. (*FlickerFree* includes a built-in demo that shows even hotter speedups, such as 750 percent. That's an extravagant claim my tests couldn't duplicate, but who's to complain about my mere 200 percent improvement?)

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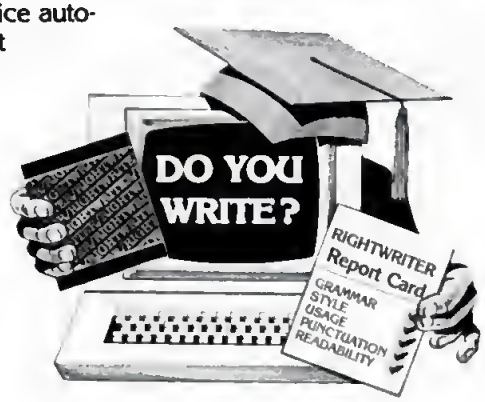

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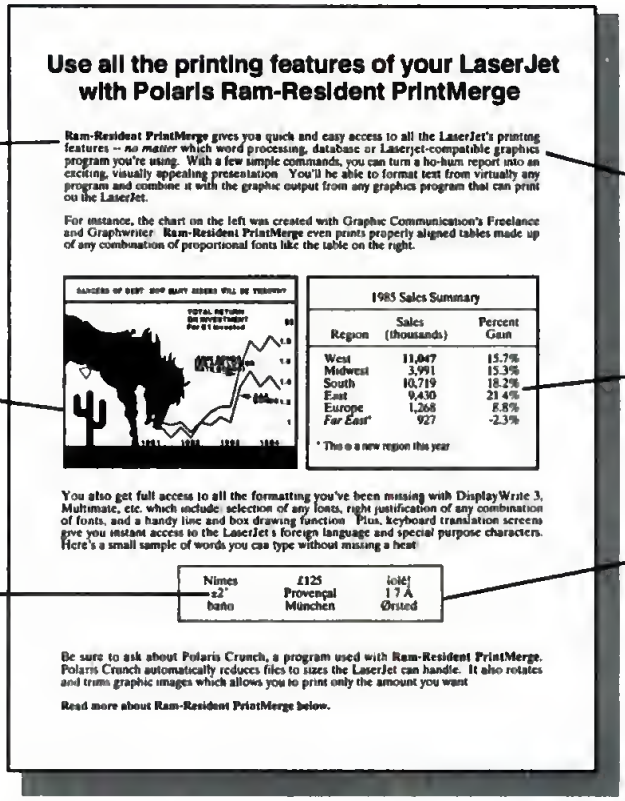

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Recommended by HEWLETT PACKARD

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■ **PETER NORTON**

things like the DIR command, and it's mind-blowing to see the difference *FlickerFree* makes in how fast the list of files appears. It's as dramatic as the difference between a plain PC and an AT.

Just because *FlickerFree* passes that test doesn't mean that all your programs will run that much faster, or even that the display portions of the programs will be accelerated, but *FlickerFree* does speed up some things, which is worthwhile in itself.

■ Speedup is only one aspect of *FlickerFree*. Its main mission is to get rid of the garbage that afflicts many screens: snow and scroll-flicker.

While the speedup is fun to benchmark-test, it's only one aspect of *FlickerFree*. The program's main mission, as the name suggests, is to get rid of the ugly garbage that afflicts many screens: snow and scroll-flicker.

I wasn't able to give *FlickerFree* an exhaustive test on all kinds of hardware and software combinations, but it often made an impressive improvement (and when it didn't, I didn't lose anything). Since the software tries to make an intimate modification of something so fundamental as the display screen operation, the results, as you might expect, are sometimes weird and wonderful.

All in all, though, I'd give a thumbs-up to *FlickerFree*. Certainly, the showboat tricks it performs on the screen are fun to watch.

Using *FlickerFree* costs about 7K bytes of memory (something that ought to be quoted concerning every memory-resident program).

If you want to get your hands on *FlickerFree*, order from Steve Gibson, 9 Lago Sud, Irvine, CA 91725; (714) 854-1520; it's $39, plus $1.50 shipping and handling.

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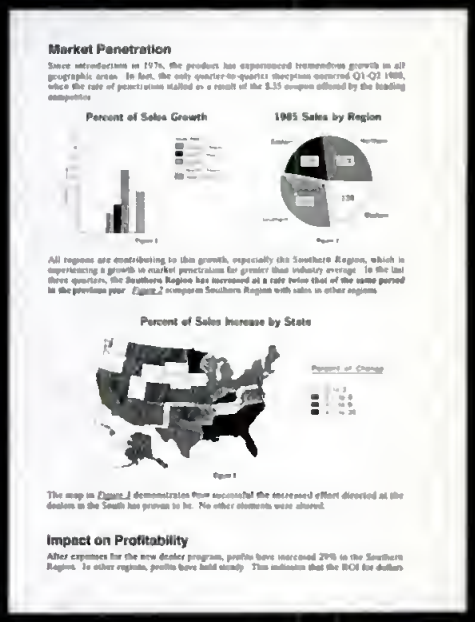
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Percent of Sales Increase by State

Percent of Change

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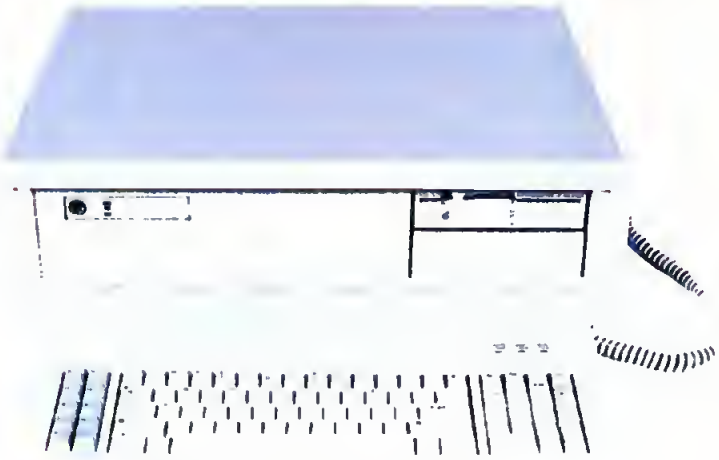

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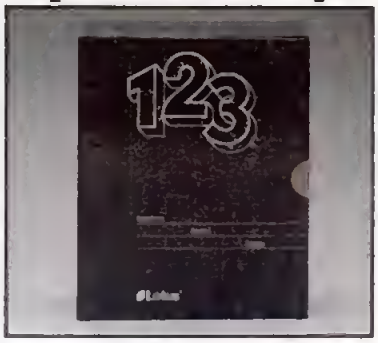

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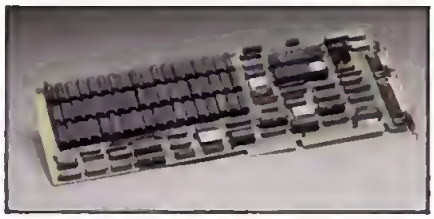

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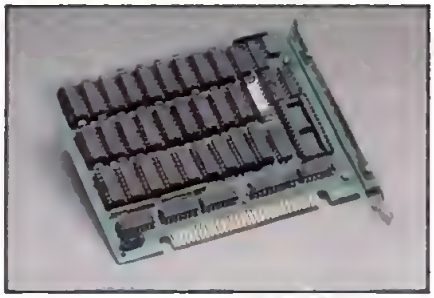

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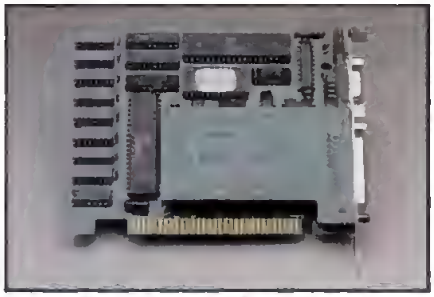

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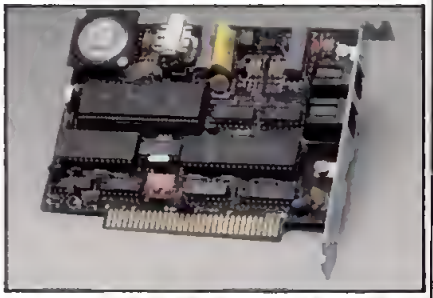

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■ JIM SEYMOUR

WHY THE 80386 PC WILL BE SO IMPORTANT

The 80386 PCs will have lots of physical memory, a few hyperbytes of virtual memory, and clock speeds pushing 20 MHz. The question is, how to use all that power and speed?

It's taken as an article of faith by the folks here at *PC Magazine*—and in most other corners of the personal computer world as well—that the PCs coming later this year built around Intel's 80386 chip are going to blow 80286/PC AT machines out of the water, if not out of the marketplace.

The 80286 PCs can do a lot of nice things, given the right DOS. I don't expect to see DOS 4.*x* sold officially in the United States; the improvements are too minor, especially when contrasted with 80286 protected-mode support in DOS 5.*x*, which we should see before the end of the year.

Which means there's certainly a lot of life left in the 80286 designs for many users. With 10-MHz and 12-MHz 80286-based AT clones becoming commonplace this summer, at low prices and often with a smaller footprint, they're bound to squeeze ordinary PCs and XTs into retirement for serious PC uses.

As I wrote last month, the 10-MHz machines run at a little over 10.0 on *The Norton Utilities* SI benchmark (versus 1.0 for the original PC and 5.7 for the stock 6-MHz PC AT); the 12-MHz boxes push past 13.0. Impressive.

DOS 5.*x* will extend the life of those fast 286 designs even further.

These smaller, faster, and cheaper ATs will be coming from everyone, apparently, except IBM, which claims (if you believe its April announcement) that gee-whiz 8-MHz ATs are all it'll need to hold off the competition till its 386 box appears. Lots of luck.

IMPRESSIVE NUMBERS Some of the ga-ga talk over the 80386 PCs comes from raw numbers: lots of physical memory, a few hyperbytes of virtual memory, and clock speeds pushing 20 MHz. Impressive figures—and a part of the puzzle.

But too little has been said, in print at least, about how we're going to use that power and speed. And that's the key to understanding why the 386s are going to be so important—and why the Machrones, Somersons, Nortons, and Seymours of the world go around mumbling "THREE-eighty-six, THREE-eighty-six" over and over.

VIRTUAL MACHINES The real, real advantage of 386 machines, I'm convinced, is that they're going to run a VM-style operating system. My guess is this will be a True Blue offering, without Microsoft's name on the box or in the credits, though that's far from certain.

Illustration: Ted Berner

And that VM/386 operating system is going to work as a big DOS manager. "VM" comes from "virtual machine," virtual in the sense we usually use for that term in the computer business: something that doesn't really exist in the physical world, though we agree to act as if it existed. (Such as virtual disks, or RAMdisks, where we know perfectly well disk drives D: and E: don't exist but are merely chunks of RAM we've partitioned off to act like disks, to get data moving at the speed of electrons, not the speed of stepper motors.)

A VM/386 operating system on your PC/386 would let you create, in effect, multiple separate computers inside that single box on your desk. Let's call them "sessions."

For Session A, you might open a window (really, firing up a virtual computer), load DOS, load *1-2-3*, then load and start manipulating a huge spreadsheet. For Session B, you might open another window (read: another virtual computer), load DOS, load another copy of *1-2-3*, then load a second spreadsheet for review and updating.

For Session C, open a third window, load DOS, load *Microsoft Word*, and load the current draft of a long report to management. For Session D, open a fourth window, load DOS, load *SideKick*, and have your beloved on-screen calculator and phone list in memory.

Now—back to work. You can jump from session to session with a keystroke or two. Calculations continue in all the other sessions (even if their windows are closed and the results invisible) while you go on

■ JIM SEYMOUR

about the business of the moment, fiddling with documents or spreadsheets or whatever in another session.

There are no conflicts among memory-resident programs because each is running in what it thinks is its own computer.

The *very* smart VM/386 operating system uses as much of those huge chunks of RAM you bought as it can, then does quick, nearly transparent disk swaps when it thinks it can get away with them, employing virtual-memory hooks in the 80386 to make it look as though you have access to virtually infinite RAM onboard to play with.

In other words, a VM/386 OS will serve as a giant DOS-session manager, running multiple DOS sessions (and, for those who care, probably UNIX sessions as well) under it.

That, my friends, is why we giggle like kids with a new puppy when we think about where the 80386 (and—dare I say this?—the 80486) are taking us.

And why you will, too.

■ The real, real advantage of 386 machines is that they will run a VM-style operating system.

SOME CLOUDS Time for the bad news. For one thing, we'll be seeing 386 PCs from vendors other than IBM this summer—before the Big Blue 386 machine appears. (What should we call these? "Pre-clones?") While these will be swell machines, and I'm sure I'll buy one, without that IBM standard in place, there's no guarantee (what an understatement!) these clones will run a VM/386-style OS when it's available. I expect IBM to make VM/386 a highly proprietary product, intimately matched to IBM's 386-driven hardware. So buying one of those first-round non-IBM 386s may be a risky proposition.

For another, don't expect to see a VM/386-style OS from IBM at the moment the company ships a 386 machine. That's clearly where IBM's going, but while I think we'll see an IBM 386 hardware design announced, and maybe even delivered, before the end of 1986, I don't expect a VM-like OS to be available this year.

Like the 386 machines themselves, that kind of power is still dancing just beyond our reach. But soon, real soon . . . . PC

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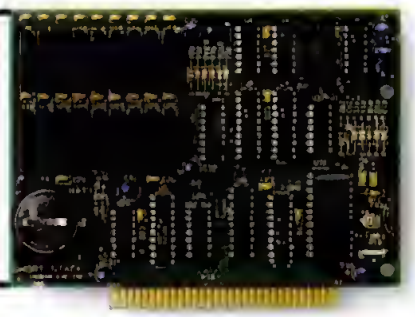

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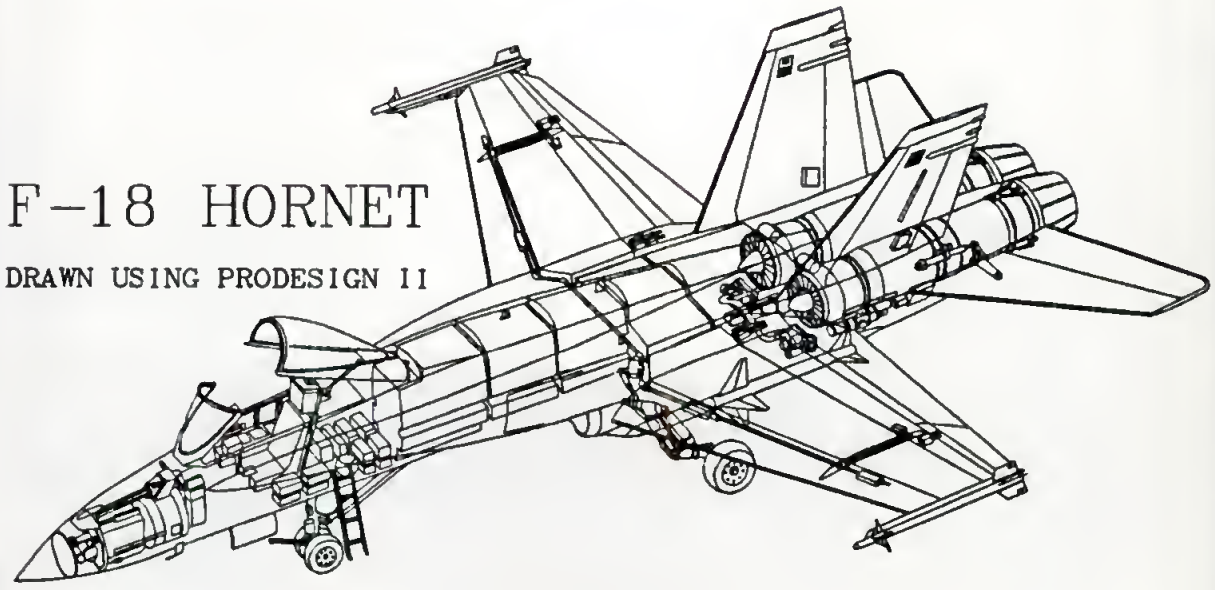

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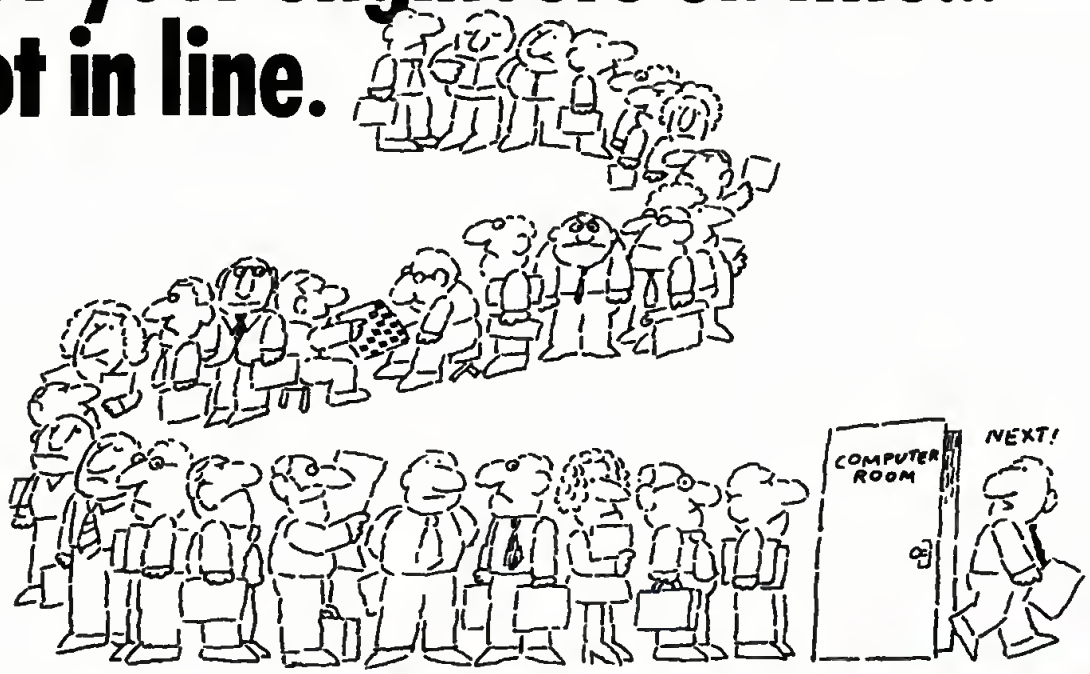

How many long unproductive hours have you spent "in line" for your simulation? Well, no more. MICROCAP and MICROLOGIC can put you on line by turning your PC into a productive and cost-effective engineering workstation.

Both of these sophisticated engineering tools provide you with quick and efficient solutions to your simulation problems. And here's how.

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MICROCAP is an interactive analog circuit drawing and simulation system. It allows you to sketch a circuit diagram right on the CRT screen, then run an AC, DC, or Transient analysis. While providing you with libraries for defined models of bipolar and MOS devices, Opamps, transformers, diodes, and much more, MICROCAP also includes features not even found in SPICE.

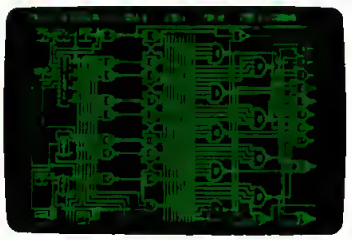
MICROCAP II lets you be even more productive. As an advanced version, it employs sparse matrix techniques for faster simulation speed and larger networks. In addition, you get even more advanced device models, worst case capabilities, temperature stepping, Fourier analysis, and macro capability.

"Typical MICROCAP Transient Analysis"

MICROLOGIC: Your Digital Solution

MICROLOGIC provides you with a similar interactive drawing and analysis environment for digital work. Using standard PC hardware, you can create logic diagrams of up to 9 pages with each containing up to 200 gates. The system automatically creates the netlist required for a timing simulation and will handle networks of up to 1800 gates. It provides you with libraries for 36 user-defined basic gate types, 36 data channels of 256 bits each, 10 user-defined clock waveforms, and up to 50 macros in each network. MICROLOGIC produces high-resolution timing diagrams showing selected waveforms and associated delays, glitches, and spikes—just like the real thing.

CIRCLE 496 ON READER SERVICE CARD



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MICROCAP and MICROLOGIC are available for the Apple II (64k), IBM PC (128k), and HP-150 computers and priced at $475 and $450 respectively. Demo versions are available for $75.

MICROCAP II is available for the Macintosh, IBM PC (256k), and HP-150 systems and is priced at $895. Demo versions are available for $100.

Demo prices are credited to the purchase price of the actual system.

Now, to get on line, call or write today!

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■ STEPHEN MANES

CONFESSIONS OF AN UNPAID CONSULTANT

Intense competition in the microcomputer business has given consumers a confusing range of products to choose from. Guess who's just been drafted to sort them out.

You pick up the phone. The frazzled, deferential voice on the other end claims to be a friend, or a friend of a friend, or a friend of a friend of a friend. Within the next 15 seconds, you hear the words "They say you know a lot about computers."

Your cornea clouds. Your cochlea crackles. You enter a trancelike state. You are participating in a transmogrification more mysterious and frustrating than lycanthropy, and you are powerless to resist. You are about to become that rarest, most necessary of beings—the unpaid consultant.

Flushed with confusion, the disembodied voice has received a bushel of contradictory advice from rapacious salesmen, evangelistic cohorts, and enthusiastic relatives. You, lucky you, have been selected to sort out fact from fiction, truth from hype.

FREE CONSULTATIONS There is no rational way out. You consider "accidentally" disconnecting the phone and hooking your modem up for autoanswer, but you're afraid one blast of carrier tone in the ear might permanently impair the hearing of your litigation-prone attorney. You resign yourself to the knowledge that the next hour of your life will be irretrievably lost in a sea of *déjà entendu:* "Wait, I'm writing this down. Now, what was it you said about this Monotone Spray Cod?"

In theory, it's wonderful that intense competition in the microcomputer business has given consumers a truly gargantuan range of hardware and software options. In practice, not even *dBASE III* can sort them all out, and the people who need help most desperately are the least likely to get any.

A corporation that's buying 100 PCs to link up with its mainframes can afford to keep somebody around who knows how to do it or contract the project out. The poor guy who wants a system to run his garage golf-ball-retreading business or produce the Great American Video can't spring for expensive hours of a consultant's time. That's where you come in.

Alas, things you take for granted are utterly befuddling to the abject novice. He's wondering if he should buy IBM or the Clamdip-98, the hotshot new Szechuanese wonder his boss Morty swears by. Or maybe he should cheap out and go the Commodore-64 route. His aunt Louise insists her Commodore-64 can do anything any IBM can *and* peel potatoes.

"Did Aunt Louise mention that her Commodore won't run the *TakeAGander* integrated database, which is the program you say you're interested in?"

"No kidding! You're sure? All right, forget the C-64. What about the others?"

"Well, no matter what you buy, if you've got your heart set on *TakeAGander,* you'll need a memory upgrade."

"Wait, I'm writing this down. Memory upgrade."

You point out that the Clamdip-98 has room for the memory right on the motherboard, but the IBM will need an add-on memory card. But then he may as well get a multifunction card for the clock and the serial port that are built into the Clamdip. Unless he buys an AT.

"Wait, I'm writing this down, and there are a couple of things here I'm not clear about. I've got lots of clocks around here. What do I need with another one? And could you explain mutterboard, multifunctional card, and stereo port? Oh, and AT?"

THE MOMENT OF TRUTH So you do explain, you do, half wishing your palms would turn hairy and your only possible response would be a muffled growl. Sometime in the next few minutes, you run into the inevitable Moment of Truth. Your caller suddenly says: "Let me get this straight. If I buy the IBM, I also have to buy a multifunction card, a display card, a monitor, a clock, and extra memory? And that's going to set me back maybe a thousand dollars above the base price of the machine itself?"

"Thereabouts."

Illustration: Ted Berner

■ STEPHEN MANES

"But on the Clamdip-98, I get all that stuff free?"

"Except for the extra memory, which should set you back a hundred bucks installed."

"So why in the world would I possibly want to buy the IBM?"

Sighing, you agree that the Clamdip does look like a very good deal, and you recount the growing list of friends who swear by it. But you explain the problems the Clamdip folks have had keeping up with demand. You note that many Clamdips have been delivered without benefit of manual, DOS software, or microprocessor. You observe that should something fail in a Clamdip-98, replacement parts may be transported on the slow boat from China. You point out that Clamdip Computers has been in business for 10 long weeks. And you recount the cautionary tale of your friend who bought a business computer from one of the very biggest firms in the industry and can't get it fixed now that the company's making nothing but refrigerator-magnet novelties.

"Okay, you've convinced me. I'll go IBM. True Blue all the way."

You could leave it at that, but your conscience won't let you. You explain that he can't quite go True Blue all the way because IBM doesn't make a multifunction card. Then you remember that *TakeA-Gander* runs slower than a horse cart on anything less than an 8-MHz AT. You start asking questions and discover that your interrogator really doesn't need much more than a simple database manager and a decent word processor. You somehow convince him to go with a couple of good programs you know of.

JUST A FEW MORE QUESTIONS

"Just a couple more questions. I see here a PC, an XT, or—oh, yeah, here it is!—an AT. And a bunch of models. I have no idea what the difference is. Tell me which one to buy. Remember, go slow. I'm writing this down."

Deep sigh. You cooperate. You whittle down the selection. You come up with a couple of choices. You even suggest a printer and a dealer.

"Now, one last question. My kid's got a lot of friends with Commodores. There's no reason why their programs won't run on this machine, right?"

The transformation is complete. Your palms are sprouting luxurious tufts of silicon. You run outside and howl 1,200-baud carrier tone at the telephone wires.

"Don't stare," you hear a neighbor tell her little daughter. "It's just that guy who knows all about computers. Come to think of it, there are a couple of questions I want to ask him about your TI 99/4."

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MADE IN THE U.S.A.

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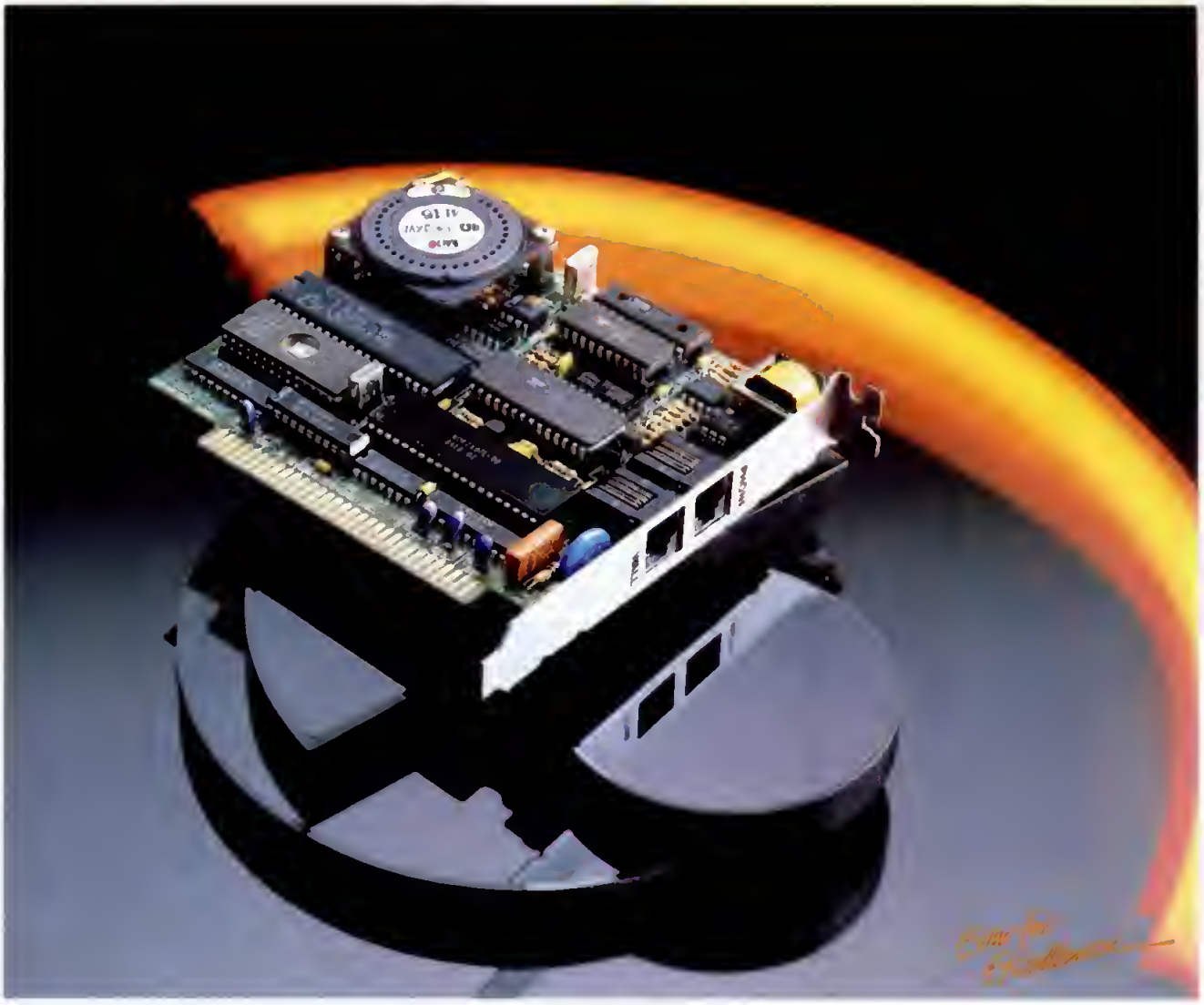

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• Automatic data-to-voice transition	YES	NO
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• Reports speed mismatch	YES	NO
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Communicate

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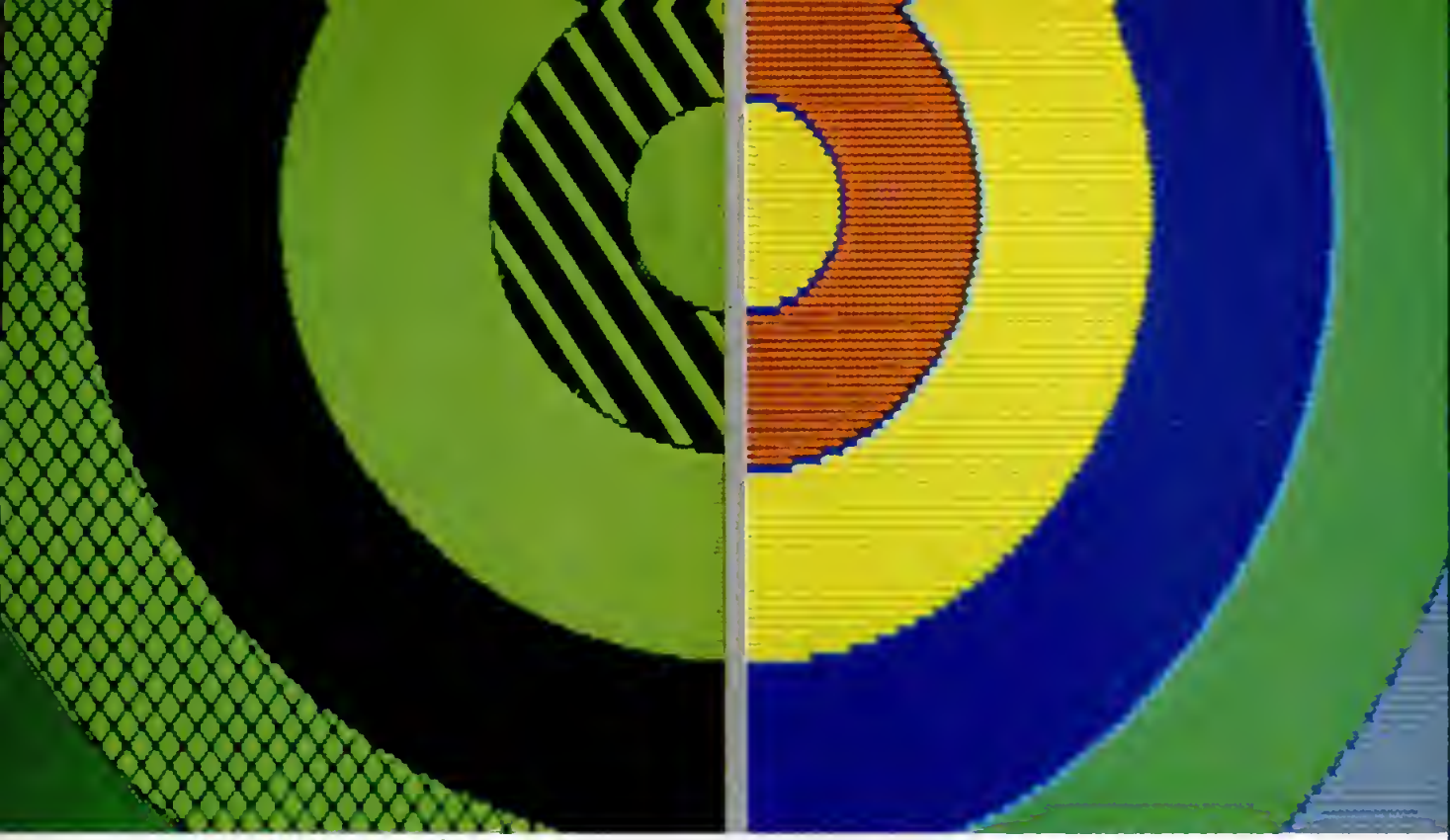

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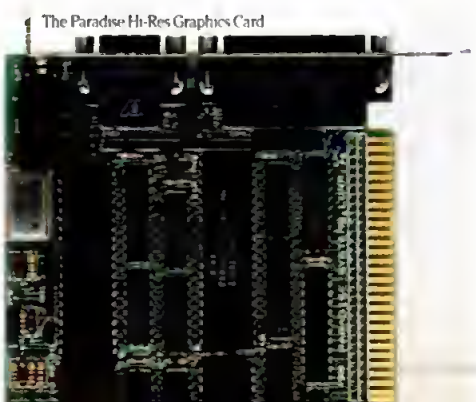

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CIRCLE 386 ON READER SERVICE CARD

■ STEWART ALSOP

PLAYING GAMES: A WORTHY PURSUIT

All work and some play just might make Jack a more productive businessman. PC designers should overcome their prejudices and produce a business machine equipped for serious fun.

WARNING: THE SURGEON GENERAL HAS DETERMINED THAT USING THIS COMPUTER TO PLAY GAMES COULD DISRUPT YOUR SOBER BUSINESS SENSE AND LEAD TO LONG-TERM CAREER DAMAGE.

Quite frankly, I wouldn't be surprised to see a sticker with the above warning stuck to the side of my new PC system when it arrives. People who sell computers for business use don't seem to believe that playing games is a worthy pursuit. Business computers are supposed to be serious devices, used for serious, productive tasks. Games just aren't serious; they certainly aren't productive. Are they?

LET'S HAVE SOME FUN Sometimes, the people who make business computers strike me as a bunch of killjoys. I strongly believe that fun is an important if not necessary element of success in business. Yes, the object of any business venture is serious, generally revolving around the twin challenges of providing a product or service that has value and making enough money in the process to be able to continue doing so. But if you don't have fun, what's the point of working your rear end off to achieve that objective?

In fact, I think one of the reasons that spreadsheets—first *VisiCalc*, then *1-2-3*—became so popular is that they can be a lot of fun to use. The fact that spreadsheets respond so quickly to what you do, that the screen repaints every time you do a recalculation, that you can pretend all sorts of things (like high margins, hot sales, and high-growth markets), all contribute to turning a spreadsheet into a kind of business game. When Lotus added the ability to turn your fantasies into graphs, it was like adding graphics to a text adventure.

But the killjoys don't believe that playing games is businesslike. So they build their computers so that it's nearly impossible to make a truly playable game run on them. The PC designers seem to blanch at the idea of someone's actually wanting to use the computer to play games or wanting to inject a sense of humor into business programs. If any manufacturer had the temerity to put a couple of joystick ports on its PC-compatible computer, it would instantly be branded as a home computer, useless for business, even if it had a 12-MHz processor, 4 megabytes of memory, and 60 megabytes of hard disk storage.

The result is that the IBM PC and its close cousins tend to be horrible machines to try to entertain yourself with. In order to play the game programs that are most popular on other computers, you'll wind up shelling out enough money to turn your computer into a real power system, including a color monitor, video adapter, sound generator, joysticks, and adapters.

Illustration: Ted Berner

This weakness among PCs has been something of a problem for companies that specialize in making entertainment programs. Those companies, which charge much lower prices than even Borland International, need to sell lots of copies of a program before they begin to make money. And the largest number of people to own a single group of compatible computers are PC owners: more than 5 million of them now and growing by more than 2 million a year. By contrast, the entertainment companies can sell to only about 3 million Commodore 64 owners, about 2 million Apple II owners, and less than 1 million assorted Atari owners.

NOT A GAME Needless to say, the entertainment companies have been brazenly lusting after the IBM PC market, with little success so far. In fact, the best-selling entertainment program of all time for the IBM PC isn't even a game. *Flight Simulator*, developed by a little company called Sublogic Corp., near Chicago, and sold by Microsoft Corp., theoretically teaches you how to fly a Cessna 182 single-prop airplane. You don't play the program as a game, aside from avoiding a crash and landing the plane successfully. The graphic display is nearly irrelevant, unless you

■ **STEWART ALSOP**

have an enhanced graphics display. And the sound, sort of an intermittent squeak, is a joke.

The second-best-selling entertainment program is probably *Gato*, from Spectrum Holobyte in Boulder, Colorado, which lets you pilot a World War II submarine around the Pacific and try to sink Japanese ships. *Gato* is a game, since the Japanese ships can also sink your sub, but its primary attraction appears to be the challenge of monitoring all the elements of a submarine, which is nearly as challenging as keeping an airplane aloft. More recently, another submarine simulation called *Silent Service*, from Microprose Software, near Baltimore, has hit the best-seller lists.

With the success of *Flight Simulator* and *Gato*, designers of entertainment programs began to figure out that people who use IBM PCs like complex simulations of real-life activities, even if the simulations tend to be crippled because of the PC's inability to handle graphics and sound.

So they asked themselves what activities business people seem to like most. Sports, of course. So now the market is being flooded with sports simulations. The first and apparently most successful of these was *NFL Challenge*, introduced by Xor Corp. late last year. *NFL Challenge* is an extensive and complicated football game that uses real players from any of the NFL teams and corrects for those players' actual strengths and weaknesses.

A GAME OF GOLF More recently, two Silicon Valley companies have published simulations of the ultimate business game: golf. Activision's *Championship Golf* allows you to control the angle and pitch of swing and shows you how the club hits the ball. In addition, the game is designed so that Activision can sell you the scenery and layouts for any major golf course. (The first version's course is at Pebble Beach.) Accolade's *Mean 18*, on the other hand, doesn't give you as much control over your swing, but it has better graphics and gives you the Course Architect, so you can design your own courses. If their predecessors are any indication, both of these games should be smash hits.

In light of the popularity of some of these games, will manufacturers finally introduce PC-compatibles that will let us play real games? Currently, the Tandy 1000 is the only machine that does so—and at a reasonable price. Hopefully, its success in the home market will lead other manufacturers to produce IBM-compatible games/home computers, despite the debacle of the PC*jr*. In my next column, I'll show manufacturers what they can do to succeed in this market by designing my own version of a home computer. PC

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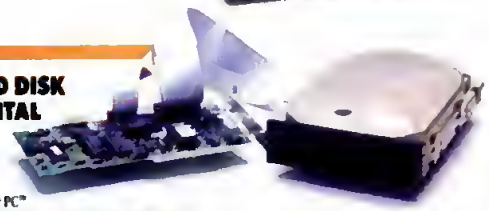

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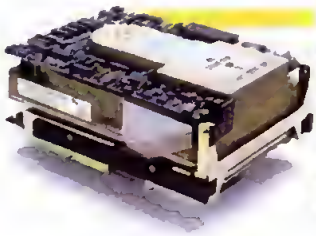

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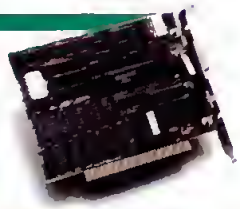

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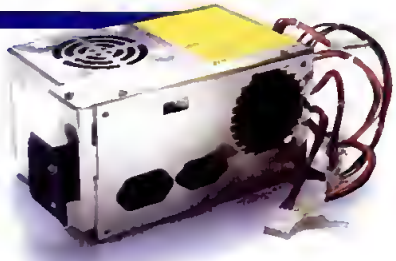

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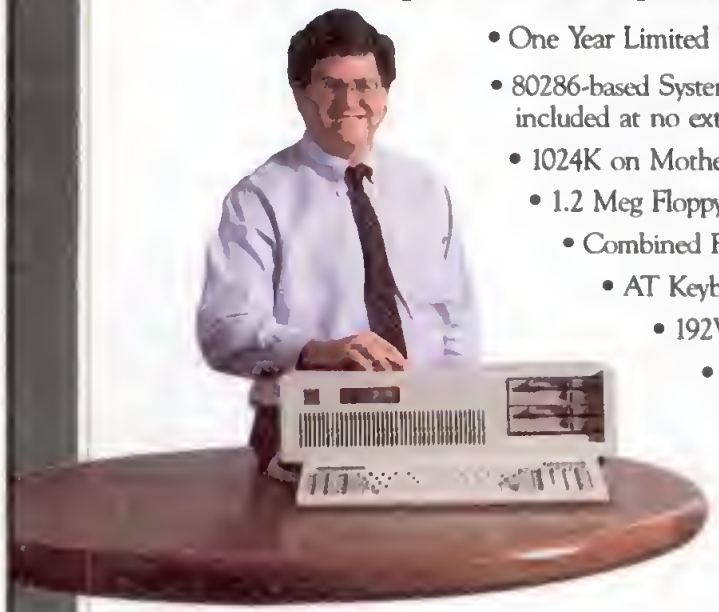

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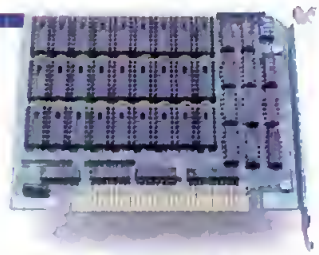

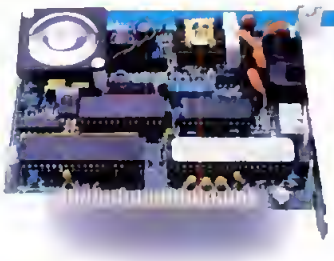

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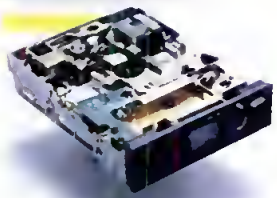

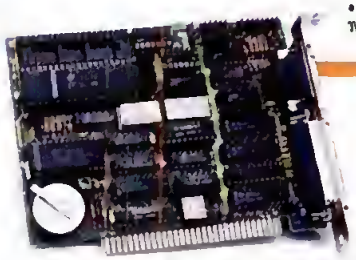

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CIRCLE 539 ON READER SERVICE CARD

DOS TO TRAVEL

The new generation of portable computers takes DOS wherever you might need it. But portability inevitably means compromise, making some of these machines less practical than others.

Portable computing is new all over again. IBM has dignified the market with its presence. The 3½-inch disk drive is a firm standard. Prices are down. And the technology is better than ever.

At the heart of this market is the desire to take DOS along. While notebook computers are fine for light word processing, small spreadsheets, and on-the-road telecommunications, they fall short of full compatibility with office systems. Why relearn your key applications or do without some of your favorite features? The new generation of DOS machines is highly compatible with what you use

Photograph: Craig Cutler

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CAPACITY

in the office. All but the most bullheadedly copy-protected programs can generally be installed on the 3½-inch disks.

The state of the portable art has evolved to the point where you can even consider using a portable as your primary computer. Most of the new machines offer "docking" of disk drives and monitors. One (not IBM) even allows you to attach a standard IBM keyboard. All except one (IBM) include a printer port on the base machine.

For our comparative testing, we selected the IBM PC Convertible, the Toshiba T1100, Quadram's Datavue 25, the Kaypro 2000, the Gridcase 3, Zenith's Z-170 PC, the Sharp PC-7000, the Compaq Portable II, and Panasonic's Executive Partner FT-70. These nine machines are our picks for the serious contenders in the take-DOS-along market today. The new 80286-powered Toshiba 3100 with internal hard disk was announced at Spring Comdex. Our first look appears in the news section of this issue.

These machines differ widely according to their manufacturers' perceptions of what the on-the-go user needs. Some are battery powered, some not. Some use 5¼-inch disks; others, 3½. Several varieties of liquid-crystal displays coexist with plasma displays, and one sports the traditional CRT. Some have add-on printers; one has a built-in printer.

ALSO-RANS You may see some familiar names missing from our list. Some machines fell from view. Others fell from favor. A few just fell on their faces.

The Data General/One is a good example. At the time of its introduction, the machine clearly pushed the state of the art in miniaturization and functionality. Its designers worked hard on compatibility, right down to the aspect ratio on the screen. Unfortunately, they had to sacrifice contrast and visibility angle in order to get such a large LCD. (The exchange "Why don't you turn it on?"/"It *is* on" is no joke. It happened in our offices.) DG gambled and lost. Users were more concerned with readability than having Lotus's *1-2-3* draw round pie charts. The combination of low contrast and high price proved all but fatal to the DG/One, and it's no longer a factor in today's market.

The Hewlett-Packard 110 is another

DOS GETS BETTER—AND MORE EXPENSIVE, TOO

DOS 3.2 adds new commands and a unique device driver and makes some minor changes.

As usual with new PC-DOS versions, PC-DOS 3.2 has been released in conjunction with a new product (the PC Convertible), but it can run on all previous members of the IBM PC family. PC-DOS 3.2 is available on either one 3½-inch 720K-byte disk or two 5¼-inch 360K disks. These disks include everything in PC-DOS 3.1, plus three new programs. At $95, PC-DOS 3.2 is the most expensive PC-DOS yet.

The shining star of the new PC-DOS is XCOPY, a fast file-copy utility that combines features of COPY, BACKUP, and RESTORE. XCOPY is fast because it reads as many files as possible into available memory and then writes them out to the target. (COPY and BACKUP, on the other hand, have to continually alternate between the source and target drives for each file they copy.)

Like COPY, XCOPY has a /V switch to verify all file writes. Like BACKUP, it has /M and /D switches to restrict copying based on file modification or the file date. A /S flag lets XCOPY find files in nested subdirectories and create the subdirectories on the target disk if they don't already exist. A /P switch prompts you with a "Y/N?" for each file, and a /W switch lets you swap disks before XCOPY starts up.

You can also use XCOPY as a backup utility. The advantage over BACKUP is that the copied files are directly usable. On a Bernoulli Box attached to a PC, I XCOPYed over 1,200 files from one 10-megabyte cartridge to another in just under 15 minutes. The bonus, of course, is that the files are unfragmented on the target cartridge. However, XCOPY's usefulness for backing up hard disks is diminished by two problems: first, it does not recognize hidden files, which are used by many copy-protection schemes, and second, it has no built-in provision for changing target disks when they become full. (You can get around this second problem by using the /M switch and repeatedly running the same XCOPY command for different target disks.)

The second new program in PC-DOS 3.2 is REPLACE, yet another file copy utility. REPLACE can replace all copies of a particular file (which may be located in various subdirectories of a hard disk) with a new version. Using a /A switch adds the source files to the target without overwriting existing files. The manual recommends using REPLACE after a SYS command when upgrading an existing machine to DOS 3.2.

The third new program is DRIVER.SYS, a device driver that can be included in your CONFIG.SYS file. It lets you create a new logical disk drive letter that references the same physical disk as an existing disk drive letter. This type of thing happens automatically on a PC with only one disk drive: logical drive letters A and B both refer to the same physical disk drive. DRIVER.SYS lets you do the same thing for another drive. This is most useful when installing the external 720K-byte 3½-inch disk drive in a PC, XT, or AT. By using DRIVER.SYS to give this disk drive a second drive letter, you can XCOPY files from one 3½-inch disk to another using the same physical drive.

PC users who have been getting an "Out of environment space" message after executing a few too many SET commands from batch files need no longer resort to patches or undocumented COMMAND.COM switches. If you specify COMMAND.COM as a SHELL program in your CONFIG.SYS file, you can use the /E switch to specify your environment size up to 32K bytes. Note that this

is the same switch that worked (but was undocumented) in DOS 3.1, but the DOS 3.1 switch required a 16-byte paragraph environment size instead of bytes.

Some smaller changes: FORMAT and DISKCOPY now support the 720K-byte 3½-inch disk format (of course). FORMAT 3.2 will not run unless you give it a drive letter parameter—an added barrier to accidently formating your hard disk. ATTRIB 3.2 lets you manipulate the archive attribute of files as well as the read-only attribute.

The elongated shape of the PC Convertible display may make printing graphics screens on the printer a problem. You may want printed graphics to look the way they do on the Convertible display or as they would appear on a normal display. The GRAPHICS 3.2 resident graphics screen print program lets you make this decision yourself.

The disappointing aspects of PC-DOS 3.2 are its omissions. Although Microsoft has stated that future versions of MS-DOS will support the Lotus/Intel/Microsoft Expanded Memory Specification, that support is not included with PC-DOS 3.2. ANSI.SYS 3.2 still does not support the Enhanced Graphics Adapter (EGA) in 43-line mode or for video pages other than page 0. No changes at all have been made to ANSI.SYS.

Although documentation for BASICA 3.2 did not reach the editorial offices of *PC Magazine*, some creative DEBUGing and experimentation reveal five new BASICA commands. Three of these commands are EXTERR, LOCK, and UNLOCK, corresponding to the extended error-handling and file-locking and unlocking functions of DOS.3.*x*. Another new BASICA command is PCOPY, which lets you copy one video page to another.

BASICA 3.2 also includes some support for the EGA, but this support is so minimal that it is likely to infuriate BASIC users. The PALETTE command lets you manipulate the EGA palette registers so that you can map default colors to other colors. This is particularly useful in medium-resolution mode because it means you're no longer stuck with the same two sets of three colors.

The PALETTE command is the extent of EGA support in BASICA 3.2. In fact, the SCREEN and PCOPY commands do not even recognize the additonal video pages in the EGA's 80-column text mode. Support of the EGA graphics modes is nowhere to be seen.

PC-DOS 3.2 gives the PC user a couple of extra tools that would certainly be worth a $30 update charge. Unfortunately, there is no update policy for DOS, so you'll be shelling out the full $95 for it. That's obviously too much money. But for those who spend many hours at their PCs, keeping up with the latest DOS version comes with the territory.

—Charles Petzold

PC MAGAZINE FACT FILE

PC-DOS 3.2
IBM Corp.
P.O. Box 1328-W
Boca Raton, FL 33429
(800) 447-4700
List Price: $95
Requires: One 360K or 720K disk drive.
In Short: While necessary for running programs on the PC Convertible, this new PC-DOS version includes some new utilities and enhancements that also make it appealing as an upgrade for existing PCs.

CIRCLE 697 ON READER SERVICE CARD

early machine that has fallen from favor. While it runs MS-DOS from ROM and has CMOS memory emulating a disk drive, it retains just enough HP iconoclasm to keep it out of the mainstream. Instead of using PC-standard I/O, it was designed around HP/IL, a simple serial interface that HP had designed for its popular HP-41 scientific and engineering calculators. The HP Portable Plus had some nice improvements, including easily replaced ROM packs and a larger screen. But the machine still hasn't caught fire in the marketplace. HP is fiercely proud of its engineering talents and doesn't like having to adopt anyone else's standards.

People have been trying to make computers more portable ever since the advent of the microprocessor. The mid-seventies saw a number of briefcase computers, portable terminals, and calculators that were really computers. Lack of standardization, high prices, and low demand killed all of them. One company, Computer Devices, competed heavily with Texas Instruments for leadership in the portable terminal market. Interestingly, CD's swan song was a portable computer, the Dot. It was one of the first machines to use 3½-inch disks and it ran MS-DOS. Beyond that, it had few redeeming values.

Some other small machines that had their day in the sun were STM, Gavilan, and Hyperion. You can still find Hyperions (wearing an Anderson-Jacobson label) at most airports, generating printed directions at the Hertz counter. The others have fallen by the wayside, victims of themselves and the unpredictability of consumer tastes.

No discussion of portables would be complete without mentioning the Golembo effect. Coined by consultant Eri Golembo, the rule states that "consumers will buy any device that comes in a smaller package, as long as it retains the functionality of the original, especially if it has a handle."

The big issue for these machines is: what constitutes functionality? If swapping 5¼-inch disks is at the top of your list, you'll be looking at one subset of these machines. If it's important that two or three people gather around the screen to discuss the results, you're into a different group. Other features may be of paramount im-

A WISH LIST FOR BIG BLUE

IBM could have given us more than it did in its pleasant convertible laptop. Now the market's open for those enterprising souls who can fulfill our dreams.

Given that IBM has vastly more resources at its beck and call than does a Quadram or Toshiba, Big Blue just as easily could have given us a CMOS 80286 clamshell with a plasma display option as it did this pleasant, breaks-little-new-ground laptop.

Here's a wish list for IBM's Convertible. Keep in mind that the machine includes a 72-pin full-system bus extension in back, so third-party developers can turn your dreams into reality the minute they believe the market is there.

- A processor with real speed. How about a PC Convertible II with an 80286? An 80386 in 1987? For now, we'd be happy with an 8087 coprocessor slot.
- A hard disk in a clip-on module. Quadram, recall, has a 20-megabyte hard disk built into its Datavue 25. Morrow, fighting off bankruptcy, managed to put a 10-megabyte drive in its unit.
- A Hayes-compatible internal modem. IBM's $450 "Control-N" command set internal unit is an affront to industry standardization. (It is on the IBM standalone modem introduced in late 1985, but that one at least included the Hayes commands as an alternative protocol.) If any other company tried this stunt, we'd say it had a death wish.
- A video display adapter that drives IBM monochrome and EGA color monitors in addition to the composite monochrome, CGA color, and TV set outputs the $325 IBM adapter has.
- Since the LCD display pulls off (with a good tug), it should be replaceable with a backlit LCD or a variation on the gorgeous Grid plasma display. No one in his right mind will take the Apple IIc-like 9-inch composite monochrome monitor on the road with the Convertible, but in the evening or in moderately lit hotel rooms, you need something that doesn't depend on reflected light. Or do you really want to hook this to the color TV in your hotel room?
- Less-complicated rules about what accessories you can have connected to the back at the same time. If I/O modules are connected, the printer shouldn't be, except if you can use a special cable; if you have the video adapter connected, you must have a monitor connected to that, and so on.
- A 5¼-inch disk drive for the Convertible. Possibly, IBM's corporate interests (build support for 3½-inch drives) got in the way of good sense. Information is no good unless you can share it when and where you want to, and it's going to be a while before offices you visit with the Convertible are going to be equipped with 3½-inch drives (Macs don't count). Of course, you can always use a hard-wire serial-to-serial port or modem-to-modem file transfer, but neither is as convenient as swapping disks.
- Would you be satisfied with 512 kilobytes of RAM in your desktop PC? So why put up with it in a laptop if it's supposed to be a *full*-function PC? How about another 512K, or even a megabyte, or CMOS RAM to bring the Convertible to 640K, with the rest ready for expanded memory (for killer *1-2-3* spreadsheets) or a RAMdisk? IBM's desktop programs (notepad, calculator, and so on) would really fly if they didn't have to come off the disk each time you interrupt your work.
- A real printer. Except that it clips to the back for easy carrying, the 15-characters-per-second IBM SlowPrinter (our name, not IBM's) offers no advantages over equally small competitors.
- A math coprocessor.
- A slightly larger version of the Convertible that includes the serial/parallel modules, the video adapters, and more RAM inboard.—**Bill Howard**

portance to you. How good is the keyboard layout? How long does the battery last? How heavy is it?

On the following pages, we take a close look at the real contenders for your portable DOS dollar. These machines have either stood the test of time or have learned from the mistakes of others. At one point we had all the machines, and a ragtag collection of notebook machines, spread out on a bench in PC Magazine Labs. Half a dozen editors moved repeatedly from one machine to another, testing the keyboards, adjusting the contrast, squinting, and hefting the units. At one point, senior editor Bill Howard asked, "Do you get the feeling that as a group these things aren't ready for prime time?"

And now in ascending weight order, the new generation of DOS to travel.

—**Bill Machrone**

TOSHIBA T1100

Of all the portables we tested in this roundup, I gravitated most to the Toshiba T1100. It's the smallest and lightest of the units, a considerable plus when you travel as much as I do. It sports a single 3½-inch disk drive with a formatted capacity of 720K bytes. A full 512K bytes of RAM is standard. The model I tested also had the optional serial port and 300-bps modem. This optional board also gives you a real-time clock. The 5¼-inch disk-drive adapter is a $525 accessory that you probably won't want to be without. You can, however, make do with a $99 board that lets the Toshiba use the floppy drives on a PC or XT as if they were its own.

The screen is readable under virtually all conditions, provided there is some light. Its tilt is infinitely adjustable through a full 180 degrees, so that it's easy to catch a light source, then adjust the contrast for readability. The viewing angle is sufficiently wide so that two or three people can gather around the machine and read the screen.

DOS MAKES A DIFFERENCE I immediately put the Toshiba to the test: I charged it up and took it on a business trip. The first big difference between a DOS-

compatible and the Tandy notebook computers I usually use—besides a weight differential of 2 to 1 in the Tandy's favor—was instantly evident as I sat in the airport, waiting for my flight to board. Many seconds passed as the machine checked its memory (you can bypass the memory test) and booted DOS. More seconds passed while it loaded the word processing program. I wrote for a while, till finally my flight began boarding. My first instinct was to reach for the power switch and stuff the machine back into my briefcase. The CMOS RAM and diskless operation of the notebook Tandy 100 and 200 permit such rudeness; DOS machines don't.

I then saved my file to disk, exited the word processor, and packed up. Good thing it wasn't a cattle-call shuttle flight—I would have been left at the gate. Once on the plane, I found the Toshiba more usable on the tray table than on my lap, at least until the inconsiderate boor in front of me reclined his seat. I then had to revert to lap operation in order to gain enough room for the screen—which left this 9-pound wonder to remove the crease from my pants.

In the office, the T1100 is more flexible. You can dock it to a standard RGB monitor and to its 5¼-inch external drive. It even has a switch on the back that makes the 5¼-incher the A: drive, a convenience for using copy-protected software that requires a key disk. Its charger and power cord are small enough to fit into the carrying case, a rugged affair made of nylon and rubber.

With the optional serial port, you can use your favorite communications program to transfer files. To save space, the T1100 uses the nine-pin serial arrangement first seen on the PC AT. The subpanel that carries the RS-232 port also has an RJ-11 jack for the modem. While the unit I tested was limited to 300 bits per second, Toshiba expects to be delivering a 1,200-bps unit very soon. A switch on the subpanel lets you choose modem or RS-232 operation or turn the serial port off to conserve power. The modem is Hayes-compatible. I tried *Ascom*, *Crosstalk*, and *Microsoft Access* with equal success.

The battery pack is not removable, and so you can't carry a spare if you're going to be away from AC power for an extended period. You can, however, use the machine while the battery is recharging. The battery is good for about 7 hours of operation, 10 percent of which includes disk access.

The Toshiba T1100's thoroughly adjustable and legible screen, light weight, and adequate RAM and disk memory make it an ideal traveling DOS companion. A plus: Toshiba provides accessories that turn its laptop into a useful office companion as well.

SOME KEYBOARD PROBLEMS In practice, the function key layout, turned 90 degrees as it is, is learnable, but it leaves the keys reading right-to-left—a bad idea. Left-to-right orientation is deeply ingrained in our culture: it would have been better to number them that way. Far worse is the layout of the numeric keypad. The designers, faced with only two rows in which to place the keys, strung all the odd numbers along the top row, all the even numbers below. Of course, all the ergonomics of the cursor keys, Home/End and PgUp/PgDn, are lost. The arrangement turns all your hard-learned word processing skills into junk. A far better solution would have been to embed the numeric keypad into the keyboard as many other portable designers do. Then you would have dedicated keys for cursor movement and the other ancillary functions. Easy cursor control is far more important than fast numeric entry.

The rest of the keyboard is quite tolerable. Placement of the other keys follows normal PC practice, and the Shift, Ctrl, and Enter keys are conveniently oversized.

The contrast on the screen is at least as good as that of any LCD out there. I never felt the need for backlighting, but the screen attributes are a little strange. LCD displays are graphically oriented, but they must convert colors into shades of gray. Some color combinations, though, come out as black-on-black. This result led a couple of reviewers to assume that the machine had crashed a couple of times, when all it needed was for the color options to be set to more-compatible choices. The inten-

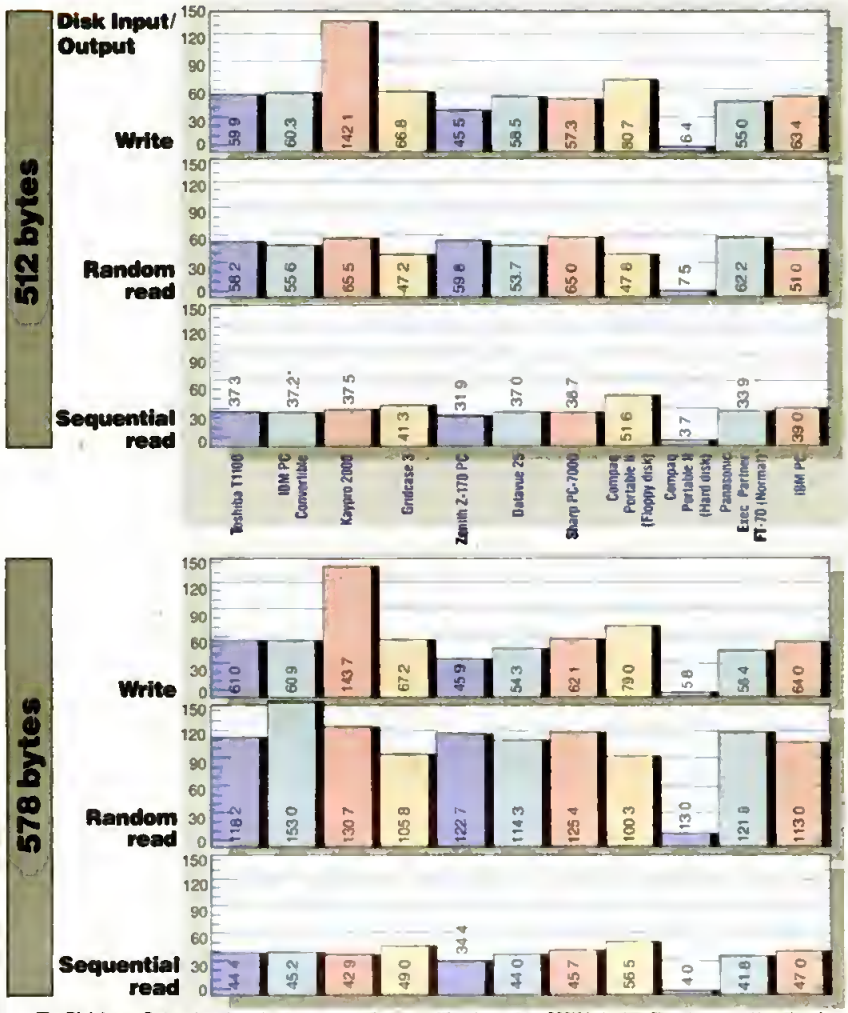
PC MAGAZINE FACT FILE

Toshiba T1100
Toshiba America Inc.
Information Systems Division
2441 Michelle Dr.
Tustin, CA 92680
(714) 730-5000
List Price: $1,995 for 512K RAM, one built-in 3½-inch 720K disk drive, LCD display, Centronics parallel printer, second floppy drive port, monochrome composite.
In Short: The lightest MS-DOS machine currently available. Cursor- and function-key implementation flaws an otherwise magnificent product.

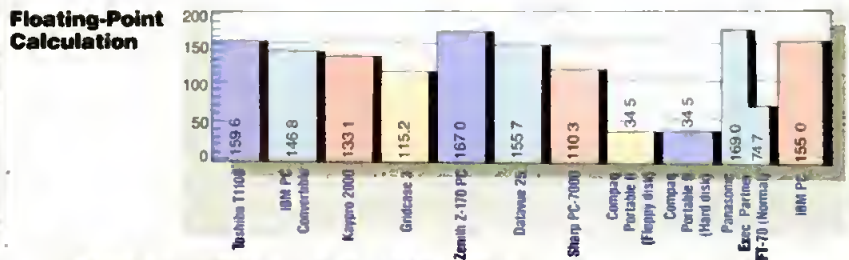
CIRCLE 630 ON READER SERVICE CARD

Photographs: Craig Cutler

PC Labs Benchmark Tests: DOS to Travel



The **Disk Input/Output** benchmark test measures the time it takes to create a 200K-byte data file using record lengths of 512 bytes and 578 bytes. The test program then performs a random read of 256 records from the created data file, followed by a sequential read of the same records. The table shows the results in seconds compared with those of the IBM PC.



The **Floating-Point Calculation** benchmark test measures processor speed by looping through a series of floating-point calculations, including multiplication, division, exponentials, and logarithmic and trigonometric functions. The test program uses the floating-point library included with Microsoft C 3.0.

*The Panasonic Exec. Partner can run at two speeds. On the normal setting the processor speed is 4.77 MHz. The fast setting is 7.16 MHz.

sity bit turns on a blinking underline, a disquieting divergence from the PC standard.

Other than forcing us to exercise some care in the screen configuration, the T1100 ran everything we threw at it. If you avoid using the help screens (disk access is slow), *1-2-3* is eminently usable. It's no slower than a floppy-disk PC, and while a single disk drive forces you to plan your program/work disks carefully, 720K is certainly adequate. *Microsoft Word* looked better on the Toshiba's LCD than it does on a standard IBM Color/Graphics Adapter. It showed no raster lines, italic looked like italic, and screen update was quick and flicker-free.

A REAL TROUPER Within the take-DOS-along constraints of this test, the T1100 is a machine to be reckoned with. You can take it on a transcontinental flight, use it the whole way, and still have enough juice left over to do a few hours' work before you collapse in a heap. Or it can spend a day in the field, far from AC power. Estimating at a construction site, aboard a

COUNTERPOINT

Dear Toshiba:

Love your machine. You've put more features (except that second disk drive) into less space for less money than IBM. But the top two rows of the keyboard! You have to be kidding. It's not a keyboard. It's a practical joke that got into production. Who ever heard of a function key layout like this:

F9 F7 F5 F3 F1
F10 F8 F6 F4 F2

Sure, it's the IBM layout turned 90 degrees, but the concept doesn't work. Same goes for the "numeric keypad" with the odd numbers on the first row, even on the second, or the PgDn key three keys to the left of PgUp, rather than just below it.

With two rows, the solution is obvious: one row, ten function keys; the other row, number keys. While you're at it, make the raised dot on the J key a little less statuesque. It threatened to rub the fingerprint off my index finger on a 6-hour coast-to-coast flight.

—Bill Howard

boat, it's comfortable and unobtrusive. After a hard day's work, it needs no more recharging than you do before it's ready again.

When it finally arrives in the office, docking it onto a standard RGB monitor and 5¼-inch disk makes it every bit as capable as a full-sized PC. Everything you want is right there, on the back of the machine. I like Toshiba's approach a lot more than the IBM Convertible's.

Even though it's the lightest unit we tested, I wouldn't want to carry this machine every day. My normal briefcase load is 10 pounds (including the omnipresent Tandy Model 100), and toting the Toshiba along would nearly double that. But I've met some salespeople in airports who trundle a Compaq Portable everywhere, every day. The glittery look they get in their eyes when they see the Toshiba virtually guarantees it a market niche.

—Bill Machrone

IBM PC CONVERTIBLE

In the 1960s, the Amphicar was a car that was also a boat. It wasn't such a hot car, and it wasn't much of a boat either. When there was a chop on the lake, the Amphicar was in danger of becoming a submarine. But it did roll two functions into one.

With the PC Convertible, IBM wants to combine dual functions, too: laptop portable computer and semidesktop computer. This marketing concept, like the Amphicar, doesn't hold water very well. As a laptop portable, the Convertible isn't half bad: very good keyboard, passable LCD display, good family name, idiot-proof DOS shell, and well-executed *SideKick*-like desktop utility set. But compared with a real desktop PC, you give up a numeric keypad, half the cursor-control keypad, full-size function keys, the crisp monochrome display, and EGA color compatibility.

It also runs into semiserious money. While $1,995 is the list price, you're talking $3,000 to get out on the road with a modem, compact printer, and I/O capabilities, and as much as $4,135 with a desktop color monitor, a 3½-inch drive for a desktop PC for file transfers, and sundry cables, chargers, and carrying cases. The business market isn't as price-sensitive as, say, the home or educational markets, but businessmen aren't chumps, either. You're paying a bit for those three reassuring letters.

STANDING TALL At 13 pounds and 12 by 14 by 2¾ inches in basic form, the Convertible is one of the bigger laptops except for the sewing machine units from Quadram and Zenith. And it gets bigger. Except for extra RAM to bring the 256K base unit to 512K and an internal modem (not Hayes-compatible), all expansion is external, via a 72-pin expansion bus. Accessories clip to the back in modules, à la the erstwhile PC*jr*: one for serial and parallel ports, another for CRT displays, a third for a 40-character-per-second (claimed—hah!) printer. It's a truly impressive sight when all three are connected at once for transportation, more than 2 feet and nearly 20 pounds of beige plastic. Imagine what it would weigh if IBM stuck with 5¼-inch floppy drives instead of the dual 3½-inch Toshiba-made disk drives.

Not only does the screen pivot open, but the disk drives also pop up and the keyboard angles slightly for a better reach. The knife-edged carrying handle pulls out to make a convenient palm rest.

There are no breakthroughs in the 80 by 25, made-for-IBM liquid-crystal display screen. IBM says it designed a special font for the screen, and there's a glare-reducing bonding process attaching the LCD to the protective glass faceplate. Among the laptops tested, IBM and Toshiba probably have the best LCD displays. But LCD technology still isn't so hot; all IBM has done is advance the state of the art to the upper levels of mediocrity. It's disappointing. It can emulate the IBM monochrome display or 640 by 200 or 320 by 200 CGA color. Like most all laptops, graphics come out squashed because of the screen

COUNTERPOINT

I was looking forward to a great portable from IBM. I'm still looking.

—Paul Somerson

I'm not sure why IBM did the Convertible. It doesn't do anything better than any other DOS-to-go machine, and it's expensive. The expansion slices are dumb, reminiscent of PC*jr*.

—Bill Machrone

A good family name does not necessarily make for the best laptop computer, as demonstrated by IBM's late entry into the DOS-on-the-road race. Despite its good looks and adequate utility software, the PC Convertible's middling LCD screen, excessive weight, and limited expansion potential make for something less than the DOS traveler's machine of choice.

ratio (much more horizontal than a CRT).

The display would be more readable in low-light situations if it could tilt back to a more horizontal position.

SYSAPPS With the Convertible comes Applications Selector, an icon-based DOS shell, and System Applications. AppSel lets you suspend an application program by hitting Fn and Esc to use one of the SysApps utilities: Notewriter, Schedule, Phone List, and Calculator. The SysApps are slower but generally more flexible than *SideKick*. Notewriter is an emasculated *DisplayWrite* (12K file size, maximum) with adequate print formatting. Schedule, the best of the four, lets you enter appointments at 5- to 60-minute intervals (with alarms, if desired). The length of the day can be expanded to cover 24 hours, if desired, and there's a free-form To Do space for additional daily notes. Daily schedules collapse into weekly and monthly schedules that fit nicely on one screen. Phone List can dial either the optional internal IBM modem or external units. Calculator has a tape trail on-screen.

PC MAGAZINE FACT FILE

IBM PC Convertible
IBM Entry Systems Division
P.O. Box 1328
Boca Raton, FL 33432
(800) 447-4700
List Price: With 256K RAM, AC adapter, Application Selector, SysApps, $1,995; DOS 3.2, $95; 128K RAM upgrades (maximum, 2), $195; 300/1,200-bps internal modem, $450; serial/parallel module, $195; battery charger, $25; auto power adapter, $25; 15-cps printer module, $295; printer cable, $45; CRT display adapter module, $325; 9-inch composite monochrome monitor, $180; 13-inch RGB monitor, $400; 3½-inch external drive for PC, PC-XT, or PC AT (separate models), $395; 3½-inch internal drive for new PC-XT, $190; hardware guide, $50; technical manual, $75; service manual, $150; carrying cases, $44 and $84
In Short: IBM's entrant is a bit heavy and bulky, considering the basic box lacks serial, parallel, and video outputs. Good keyboard feel and layout, adequate LCD display. Price mounts when you configure it with options. The 3½-inch drives mean compatibility problems for some users.
CIRCLE 638 ON READER SERVICE CARD

The System Profile can be configured to retain your current application in memory when the power is off and to pick up right where you left off 5 minutes later, or the next morning. This feature is standard on diskless laptop work-alongs (Tandy 200, NEC Starlet), but not on the machines in the DOS-to-go category.

Of all the laptop portables, the 78-key IBM keyboard is among the best. As well as a 12-inch-wide machine can, it adheres to the layout standard introduced on the RT PC and continued in the newest ATs and XTs. That means a separate cursor pad, function keys along the top, respectably sized Shift and Enter keys, and Ctrl hidden off in the bottom-left-hand corner. If the keyboard were a map of the world, Ctrl would be 10 degrees west of Cape Horn. An Fn key (not to be confused with the F1–F10 function keys), last seen on the PC*jr*, turns the right side of the keyboard into a numeric keypad and doubles the cursor keys as PgUp, PgDn, Home, and End keys.

For use in the office, IBM offers 9-inch composite monochrome and 13-inch RGB color monitors on pedestals. The mono unit looks for all the world like an Apple IIc monitor. Resolution isn't bad, but it's not the standard Monochrome Display, either. IBM missed the boat by building an external adapter that ignores IBM's two best displays: (real) Monochrome and Enhanced Graphics. Serious desktop users aren't going to be satisfied with no numeric keypad and half the cursor keys, either.

UNFINISHED BUSINESS Even though the Convertible had been a public rumor for longer than the product life of some PC clones, one impression is that of a machine that was turned loose from the lab before it was fully sorted out. Despite space-saving surface-mount componentry and the exile of I/O functions to external clip-on slices, the machine is big for what it does. Forget about using the Convertible when flying in coach unless you have a seat on the emergency-exit aisle.

Still, IBM has taken a bold step with 3½-inch drives, and IBM, with its clout, is the only company that can wean the industry away from the twice-as-big, half-as-much-data 5¼-inch floppies. Big Blue has also done a nice job of putting the speed of a desktop PC into a 13-pound package that can run for a full working day on a single battery charge. The processor (80C88) is just as fast and so are the drives; in PC Magazine Labs benchmark tests we found that the laptop actually outran the stock PC in some cases. Front-facing drives are more convenient than the side-mounted drives of the competition.

With the PC Convertible, IBM has given an aura of legitimacy to the MS-DOS laptop marketplace without unleashing an overwhelming technical tour de force. And don't be misled by the Convertible moniker. This is a solid laptop portable that coincidentally can be used with a CRT on a desktop—just like most every other DOS-to-go laptop on the market. Incidentally, the Amphicar was a convertible, too. The better to bail with?—**Bill Howard**

KAYPRO 2000

It's surprising to see something as snazzy-looking as the Kaypro 2000 emerge from a company that has spent years producing computers packaged in tin cans. The 2000 is not only good-looking; it's basically a good design—flawed by some compromises that seriously affect its usability as a laptop PC.

Somehow, Kaypro can't bring itself to save a few pounds by shrouding its laptop computer in plastic (like everyone else does), and so the 2000's sleek case is made of black anodized, brushed aluminum. However, the weight penalty of the metal case isn't as bad as one design feature that didn't even have to be part of the case in the first place: the only way to switch the 2000 on and off is by opening and closing the case. When you have to get up to let someone into the next seat on a plane or train, you'll probably shut the thing off, accidentally if not on purpose. Kaypro's designers put a great deal of thinking into the design of the 2000's keyboard. It's got the usual complement of PC-compatible keys, albeit with the function keys arrayed across the top of the board and an oddly shifted array of four cursor keys on the bottom-right-hand side. The feel is good, and it has adjustable feet, like a regular PC's, that can be used to raise the typing angle to

a more comfortable position. Best of all, you can remove the keyboard from the case. This design is especially handy when you're working on a desktop or on an airplane's tray-table because you can move the keys to wherever it's most comfortable for you to type on them.

SCREEN FLAWS The screen isn't the worst LCD display I've seen, but it's not much better. It has no contrast adjustment, and its viewing angle cannot be changed (by moving the cover back and forth, for example). The only viewing angle that worked for me was to look at the screen from slightly below the horizontal plane. Fortunately, the 2000's detachable keyboard comes to the rescue: you can pull it out of the case and perch the rest of the computer on a pile of telephone books. That solution works well in the office, but carrying the Manhattan directory onto the Long Island Rail Road just didn't cut it for me. I left the 2000 behind rather than try it out as a commuting computer. The 2000 uses a single 720K 3½-inch disk drive that's housed entirely inside the case when the cover is closed. That's heads-up design thinking in a market where the competition thinks it's perfectly fine to leave doorless 3½-inch drives exposed to the elements. Kaypro's designers even had the foresight to include a disk carrier inside the case that can house up to three disks besides the one latched into the drive.

It's unfortunate that there's only one drive on the 2000. Even though it will carry 720K in an IBM PC Convertible–compatible format, many of my favorite applications programs just barely fit, and the number of working files you can include is small as a result. Kaypro does supply optional disk drives (both 5¼ and 3½ inches) that can be attached through the expansion bus on the bottom of the case, but, once again, this is supposed to be a laptop portable, not a desktop machine.

Kaypro's $1,995 price for the 2000 seemed aggressive until IBM's PC Convertible (with two 720K disk drives) came out at the same price. If you consider the software included in the package, it still may be a bargain. But if you don't care for the full line of MicroPro products *(WordStar, MailMerge, CorrectStar,* and *StarIndex),* the *MITE* communications program, and *PolyWindows Desk,* the $700 or so worth of software may be worth nothing to you.

The Kaypro 2000 tested by contributing editor Frank J. Derfler, Jr., was powered by an Intel 80C88 processor running at 4.77 MHz (see "More Laptop Power for Less from Kaypro," *PC Magazine,* Volume 5 Number 9). The more recently shipped 2000 tested here was powered by a NEC V-20 processor, also running at 4.77 MHz. A call to Kaypro revealed the company's new policy of using a CMOS version of the more powerful Japanese Intel 8088 clone. I had no difficulty running PC software that had been transferred to the 2000's 3½-inch disks. *Microsoft Word* 3.0, when run in graphics mode, revealed that the Kaypro's ROM graphics character set is crisp and finely stroked, making it much easier to read than the machine's normal text font. Other products, including the applications bundled by Kaypro, ran without incident, and resident programs caused no special problems.

I want to like the Kaypro 2000 for its good features, but its bad ones prevent me from recommending it. If Kaypro fixes the screen so you can see it, adds a second drive, and lightens up the case, the 2000 will be a serious contender in the laptop PC market.—**John Dickinson**

FACT FILE

Kaypro 2000
Kaypro Corp.
533 Stevens Ave.
Solano Beach, CA 92075
(800) 4-KAYPRO
(619) 481-4300
List Price: $1,995
In Short: The Kaypro 2000 is a basically good design that is flawed by some unfortunate compromises.

CIRCLE 654 ON READER SERVICE CARD

The Kaypro 2000 is certainly snazzy, and it's reasonably functional, but why did Kaypro build the power switch into the case cover? Close the lid and you turn the machine off. Other design quirks are not entirely compensated for by a thoughtful keyboard and a potentially interesting bundle of software included in the list price.

COUNTERPOINT

My favorite feature of the Kaypro 2000 is its intelligent packaging. Not only is the disk drive at your fingertips, but it stores a couple of work disks right next door. The removable keyboard gets the unit's weight off your lap, but the screen needs adjustment angles in addition to a contrast control button.
—**Bill Machrone**

GRIDCASE 3

It's the only laptop in the bunch that looked good even with the roomlights off. In fact, it was one of the few that didn't prompt passersby to squinch their faces into LCD-induced moues and ask, "Is it on?" Beside it, the competitive laptop hardware crowding the PC Magazine Labs bench resembled pale plastic toys. After a few hours with the machine, I began to wonder if it possessed some extraordinary telekinetic power, since the first three words out of every single observer's mouth uniformly were: "I want one."

Nearly 3 years ago, when *PC Magazine* reviewed the Compass, Grid System's initial release, we were dazzled by its styling and technology. The svelte black beauty was a bit pricey, but its sleek brushed-magnesium shell, crisp electroluminescent screen, and high-performance tandem 8086/8087 engine turned heads whenever it was snapped open. At its coming-out Comdex, the Grid folks displayed one inside a thick glass case like some priceless, fist-sized ruby.

It looked more like a high-tech weapon than a computer, but the resemblance was apt, since some of the big initial Grid customers were CIA spooks, senior Pentagon strategists, and predatory Fortune 500 sales types. The company's sales literature crows how the unit can laugh at 130 Gs and keep on humming over microwave lines and satellite connections. It wouldn't have appeared out of place on the bridge of the USS *Enterprise*. In fact, shuttle astronauts routinely carried them aloft to aid in in-flight navigation. Reagan's staff toted them to China.

LAP WARMER But the first Grid had its problems. The screen, though miles above anything that didn't have an electron gun behind it, was small and somewhat squinty. Its disk drive was external, and, predictably, expensive. It was such a power pig that the only battery you could run it off said "Diehard" on the side. The available software was mostly proprietary, although it could handle DOS applications, sort of. And the initial batch ran so hot you literally couldn't keep it on your lap.

Still, it looked great, under your arm or on a bare executive desk. And if you managed to shoehorn a floating-point-intensive program into its bubble memory, the thing was a screamer, outperforming everything in sight. But most critics dismissed it as a costly boardroom bauble, the industry's first "status-station."

In 1985, after modest success with its Compass line of laptops, Grid Systems introduced the Gridcase, a highly PC-compatible portable with a single side-mounted 3½-inch 720K-byte floppy drive and a choice of its trademark orange plasma display or an impressive yellow enhanced-LCD screen. The LCD's 7:1 contrast ratio makes it the non-light-emitting screen of choice. Grid Systems originally offered a 4:1 gray LCD (the IBM Convertible's is 3:1) but withdrew it from the market, claiming its customers clearly preferred readability to low price.

The Gridcase is built around a CMOS 8086 CPU (with an optional NMOS 8087 numeric coprocessor), and comes standard with Phoenix PC-BIOS version 2.03, the single minifloppy drive, 128K of RAM, sockets for four user-installed ROMs, Centronics parallel (which can also be used for general-purpose parallel I/O) and RS232 serial interfaces, a five-pin DIN external keyboard interface, an external 110/220 power supply, an internal clock/calendar, an external bus interface, and a 57-key keyboard. Color-coded "Code" and "Fn" shift keys allow emulation of all 83 PC keys.

■ Because it's so energy-hungry, the Gridcase 3 is engineered with reduced power consumption clearly in mind.

The Gridcase models 2 and 3 differ only in screen configuration and price; the bare-bones yellow LCD model 2 sells for $3,150, while it will cost you a steep $4,350 to take its plasma-based model 3 cousin home.

EXPENSIVE EXTRAS You'll probably want to add a 300/1,200-bit-per-second internal Cermetek model 1750 modem ($495) and enough additional internal RAM to bring your system up to 512K ($400) or 640K ($600). Rechargeable battery packs, about the size and weight of a small Walkman tape player, go for $60 a throw, and an 8087 math chip will set you back another $195. A loaded Gridcase 3, with modem, 640K, and one battery pack runs just over $5,500.

(However, Grid's model 1250, which has a yellow, enhanced-LCD screen, 512K RAM, a 300/1,200 internal modem, serial/parallel ports, and an RGB video connection, sells for $3,500 compared to $3,355 for a similarly equipped IBM Convertible. The Convertible boasts a second floppy drive, but the Gridcase can use a megabyte of ROM-based software and offers a superior display.)

You can even purchase an optional RGB external port (another $295) built for the standard IBM color display, and an optional Grid-supplied adapter board that connects an IBM PC-XT expansion chassis to the Grid bus. This means you could plug in a PC keyboard at one end and an IBM (or equivalent) RGB color monitor or video projector at the other, and run any PC add-on boards through the expansion box. If a PC keyboard is attached, you can type both on it and on the Grid's integral keyboard; the external unit has precedence if both are used simultaneously. Or you can hook a keyboard-emulating mouse (such as Logitech's) or number pad into the keyboard connector, or even use it as a nonstandard serial port.

The external bus supports DMA and has full PC interrupt capabilities. You can hang a total of four external devices off the bus, including Grid-supplied external 3½- and 5¼-inch floppy drives and a 10-megabyte hard drive. All Grid storage devices sport a hermaphroditic bus connector that swings up or down 90 degrees to become male or female, which lets you stack such devices with a minumum of cabling. (When booting, the Gridcase tries to load off any user-installed ROMs, the hard disk, the internal floppy, or external floppy, in that order. You can override the default loading device by holding down the R, H, F, or E keys.)

The Gridcase 3's sharply etched amber charocters stand out in bold contrast to the machine's black case. The Gridcase also features an 8086 processor and, optionally, an 8087 math coprocessor. Grid Systems Corp. has corrected overheating and other problems found in previous models and has made the Gridcase 3 so sturdy that NASA and many military units use it when they take DOS on the road.

PC MAGAZINE FACT FILE

Gridcase 3
Grid Systems Corp.
P.O. Box 7535
Mountain View, CA 94039
(415) 961-4800
List Price: $5,505 (includes 640K, internal modem, and one battery pack)
In Short: An expensive, fast, beautifully designed, solid laptop with a super-readable screen.

CIRCLE 639 ON READER SERVICE CARD

The external AC power pack simultaneously powers the system unit and recharges any battery in the power-pack slot. Battery life is a question of hardware configuration and type of use. A system sporting an 8087 drains the battery faster than one without, and heavy use of the modem, floppy drive, or any serial device eats greedily away at the reserve. The LCD screen has a far more modest appetite for current than the plasma display and is recommended for long hauls between wall sockets.

Users typically end up buying several battery packs, both because a plasma-display Gridcase 3 can drain a pack in an hour or two and because the manual cautions against recharging a battery until it's fully spent. This is a real nuisance, since you have to wait until the low-battery light flickers on before you can attach the AC adapter, or you risk damaging the battery. And since you'll lose whatever unsaved files you're working on if the battery dies or if you remove one battery pack to replace it with another, you have to be ever vigilant for the low-power light and copy your working files to disk as soon as it blinks on. In addition, the shelf life of a charged battery is only about 2 months—less if it's stored in a warm place.

POWER-PINCHER Because it's so energy-hungry, the Gridcase is engineered with reduced power consumption clearly in mind. Several system functions—including the display controller logic and buffer, and the controller logic for the internal 3½-inch drive—are powered up and down as necessary to reduce unnecessary drains. The 8250 UART (Universal Asynchronous Receiver/Transmitter—the same as used in the PC) is also powered down when not in use. A sliding brightness control switch can help conserve power; the manual recommends using the darkest setting to extend battery life.

The unit's display controller can handle the standard PC 40 by 25 and 80 by 25 character screens as well as 320 by 200 and 640 by 200 bit-mapped graphics. Properly configured, it can run both the internal flat screen and an external CRT simultaneously. (Special circuitry converts color signals to monochrome for on-board display.) Custom LSI circuitry emulates the PC's 6845 display controller and adds a custom video subsystem that provides a higher-performance Grid graphics mode for such non-hardware-dependent applications as Grid-OS or *Microsoft Windows*. (In contrast to the PC, this advanced graphics mode deals in words rather than bytes and treats scan lines sequentially rather than in odd and even blocks.) The display ROM also contains an alternate character set designed to be more readable on a flat-panel display than the standard IBM font.

This powerful portable accepts up to 1 full megabyte of ROM-based software (512K under the hood and 512K on four user-accessible sockets above the keyboard) supported through bank-switching. It loads up to 128K into high memory in any combination of 32K, 64K, or 128K modules. This means that you can run up to four 32K ROM applications virtually simultaneously. Grid Systems will sell you preburned ROMs or will custom-burn them for you (if you provide a bill of sale proving that you actually purchased the product).

The system we tested came with DOS 2.11 startup files and *Crosstalk* on ROMs, and it was a pleasure to use them without having to worry about floppies. However, it would have been handier to have some of the more commonly used DOS programs such as CHKDSK on the DOS ROM. The DOS RAMDISK.SYS CONFIG file made it easy to set up a virtual disk C:, and a HELP.EXE program touts the operating system's high points effectively and steps

COUNTERPOINT

C'mon guys! How much more effort would it take to do a more-IBM-compatible keyboard layout? This is a nice machine, but I object to having to reeducate my fingers.
—Bill Machrone

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CIRCLE 229 ON READER SERVICE CARD

users through some of the thornier system areas point-by-point, with good command examples. Included on the DOS disk are a pair of programs, PCMASTER and PCSLAVE, for transferring files over a null modem between a Gridcase and a PC. Other MS-DOS files, such as FC (File Compare), are functionally superior to their PC-DOS counterparts.

While the keyboard feel and action earn very high marks, its layout and paucity of keys are a genuine drawback. You have to lean on the Fn key and hit a top-row number key (shades of the PC*jr*) to emulate the PC's function keys, which detracts from such keys' utility. And some of the PC's most popular single keys become complex multiple strokes. For instance, to perform a Grid CapsLock you have to hold down the Fn key and hit the Backspace key (which for some reason is located in the lower-right-hand corner). End and PgUp are Fn–Right Arrow and Fn–Up Arrow respectively—logical but irksome. Still, the cursor arrows are arranged in a diamond, and the keys are sturdy and intelligently color-coded. But the placement is haphazard and nonstandard. The controller provides two-key rollover and three-key lockout, and with difficulty you can program the key repeat rate and delay, as well as the debounce sensitivity. You can also map up to 20 redefinitions in a keyboard translation table, useful for foreign languages or technical applications.

Apart from the austere keyboard, the Gridcase is extremely PC-compatible, no mean task for a machine orginally designed to ignore the MS-DOS universe. You can turn on virtually all of its PC-compatible features simply by setting one bit in the System Control Register. The only real differences are insubstantial. The cursor isn't strictly the same when dealing with blinking characters. While the PC treats the Left and Right Shift keys differently, the Gridcase treats them both as a PC Right Shift (but allows you to force a Left Shift by hitting Code +Z).

Additionally, while the PC uses a single floppy-disk controller to handle up to four drives, the Gridcase uses one controller per drive "to obtain performance and flexibility advantages." Programs that try to access several drives directly through one controller won't work. The Gridcase has

IS IT ON YET?

Laptops won't catch on in a big way until manufacturers make displays that are compact, bright, contrasty, and relative power-sippers.

Pictured at the right are two screens and seven elongated smudges. It's not altogether fair to include the Compaq, with its bulky, power-hungry CRT, in this screen test, since you have to plug it (as well as the Panasonic and Sharp) into a wall outlet. The only place you can use one on a jet is in the bathroom.

Grid's remarkable plasma screen is clearly the pick of the flat-panel litter. Ordinary newsprint has a light-dark contrast ratio of 8:1. Nonbacklit LCDs all hover around 2:1 or 3:1, about the same as an elephant in a fog bank. The Gridcase 3 weighs in at a coruscating 20:1.

LCD screens are built around layers of molecules that react to electricity; when current is applied the molecules twist, changing the polarity of the reflected light. This "nametic" layer is sandwiched between a grid of electrodes running in one direction behind the panel and a transparent, perpendicular grid in front. Normal LCD molecules twist 90 degrees, yielding an image about as sharp as a tenth-generation Xerox or a tintype of your great-grandma.

In an effort to boost readability, Swiss researchers developed a "supertwisted" nametic panel that tweaks molecules 270 degrees, kicking up the contrast to 7:1. Grid uses a Japanese version of this in its model 1252 Gridcase 2.

CURRENT EVENTS Backlit LCDs, like those in the Zenith, Sharp, and Quadram, toss in a layer of electroluminescent (EL) material that emits light when current is applied to it. Unfortunately, this uses far more power than a conventional LCD and ends up washing out the image in direct sunlight.

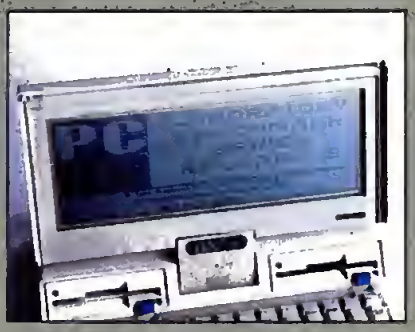
Plasma screens sandwich the standard silk-screened silver electrode grids around a manganese dioxide plate full of tiny neon-filled holes. This is the light-emitting method of choice, since it can be manufactured in large sizes; EL displays such as Grid's early Compass model must be stamped out of wafers, with low production yields. And EL screens require dense, high-powered chip-driver circuits that draw prodigious amounts of current, which means they can't travel too far from a wall socket.

Screen ergonomics are nearly as important to readability as screen physics. You can view the plasma and CRT displays clearly from any angle and in vastly different light conditions. LCDs thrive in strong, direct light while backlit LCDs pale on a sunny day; plasma is even more impressive than usual in a softly lit 747 cabin. On airborne hops in and out of Silicon Valley even worse for most LCD-using passengers than the message "Please place the mask comfortably around your nose and mouth" is "Please lower your window shades so the people around you can watch *Rocky IV*."

Full-screen 80 by 25 LCDs, which work by twisting light, end up twisting users' necks. You have to make constant adjustments in viewing angle when jumping from the top to the bottom of the screen. Some laptops, like IBM's and Toshiba's, make minor positional changes in the screen easy. Others don't.

COLOR PROBLEMS And while the Convertible handled screen attributes perfectly, many of the laptops we tested choked on colored text. These days it's common for popular DOS programs to come up in something like yellow-on-blue. IBM's laptop displayed everything adroitly. Quadram's backlit yellow Datavue, which earned high marks for general clarity and contrast, did the next best thing by offering four gray-scale shades.

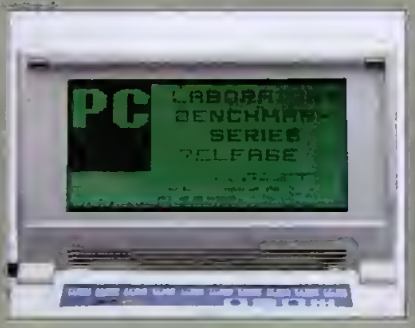
Toshiba T1100



IBM PC Convertible

Kaypro 2000

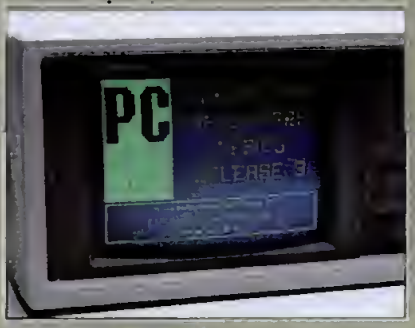
Gridcase 3



Zenith Z-170 PC

Datavue 25

Sharp PC-7000



Compaq Portable II

Panasonic Exec. Partner FT-70

The Toshiba and others worked fine if a character attribute was black-on-white or white-on-black, but stumbled over everything else; all you end up seeing on these is a string of small black blots. Our benchmark menus often resembled stark Rothko paintings.

Eighty-width LCD screens end up producing squirrelly, squinty characters; plasma text is far superior. Panasonic's dense character box is almost as good as IBM's standard monochrome screen. But the number of dots isn't the whole story; the Gridcase uses IBM's grainier color character font with no reduction in readability. Kaypro's single-dot graphics character set impressed our reviewers, but worked only with graphics-oriented programs such as *Microsoft Windows*. Toshiba's screen had special trouble with high-intensity attributes, which it identified by drawing a horizontal line through each character.

But no matter what designers do, LCD screens still look to many observers like Etch-a-Sketch toys, or gray chalk on a dirty blackboard. Plasma displays have too voracious an appetite for power; while the Grid can operate off batteries, you have to bring along several on a typical trip. Our reviewers were all dazzled by the Grid's nonpareil display, but few wanted to tote it and a half-dozen battery packs anywhere. The Grid's enhanced LCD model is a decent compromise. While it's still overlong and relatively heavy, its 7:1 display isn't bad and will last 4 to 6 hours between recharges. Most of the laptops we tested are adequate for the few people who demand full-screen IBM-compatibility on the road. Until the display technology improves, however, laptops will continue to be a niche rather than a mainstream direction.

—Paul Somerson

no cassette interface or game port, no 160 by 200 low-resolution graphics or 6845 interlace modes. But these differences really shouldn't matter to the majority of users.

Its plasma screen is vastly superior to all the others I've seen: bright, rock-steady, eminently readable from any angle. But the display doesn't shut off when the lid closes, which means if you inadvertently leave it on, the battery charge will trickle away. Also irritating is that in PC-compatible mode the hardware defaults both the serial port and modem off, forcing users to issue a MODE command to bring them to life. This is downright idiotic. And while travelers can switch from 110 to 220 volts with the flick of a switch, they must also change a fuse, a genuinely bad design. And the Cermetek modem won't work with digital PBXs.

TOP OF THE LINE The Gridcase 3 is rugged, extremely solid (and heavy, weighing in at a dense 12-plus pounds), beautifully designed and fitted. Its displays are the standards by which all others fail. If any laptop deserves to be in a museum collection, this does. It is extremely PC compatible, running all the software we threw at it without a hitch. Its accessible ROM sockets, super-readable screen, profusion of ports, quality of construction and design, and high performance make this raven rocket a runaway winner. And Grid Systems gets my vote for the best service policy: you just stick your unit into a carton and Federal Express, which maintains an inventory of loaners, swaps it out hours later for a working model. Okay, so the hardware is long and heavy, but you can't have everything. If it only had dedicated function keys, an internal hard disk, and a price tag about half as steep, they couldn't keep them on the shelves.

—Paul Somerson

The IRS, after long consideration, selected the Zenith Z-170 PC as its department-wide portable, presumably because of its twin 5¼-inch disk drives, legible, backlit LCD screen, good portability, and excellent IBM PC compatibility. The Zenith's lunch-pail shape makes it more of a tabletop than a laptop computer, but that doesn't detract from its considerable virtues.

ZENITH Z-170 PC

If your income tax return is audited next year, you're likely to find yourself staring straight down the barrel of a Zenith Z-170 PC, the Internal Revenue Service's weapon of choice for agents to use in field assignments. If you keep your cool long enough to analyze the situation, you'll probably come to admire the enemy's new weapon because, even when you're under its fire, it's difficult to ignore quality equipment at work.

I spent the better part of a weekend pecking away at the Zenith's keyboard and came back to *PC Magazine*'s offices favorably impressed. Its LCD screen is backlit with electroluminescence, which is a decent compromise solution to the portable-screen problem. LCD screens are light-weight and consume relatively little power but are generally difficult to see in poorly lit rooms. Lighting the back of the screen allows you to use the Zenith in a normally, or even dimly, lit room. The only drawback is that it is nearly impossible to see the Z-170 PC's screen under bright lighting, such as when working out of doors on a sunny day. Zenith could solve the problem by adding the matrix adjustment usually found in LCD displays, making the screen angle adjustable, or both. As things stand now, stay inside with the shades drawn and the lights low when you use the Z-170 PC.

The LCD screen is fully compatible with IBM's Color/Graphics Adapter; it works as if you have a composite monochrome screen attached. It had no trouble running such graphics applications as *1-2-3* and *Microsoft Word*, no difficulty handling programs that do direct screen-memory writes, such as *XyWrite II Plus*, and, for that matter, no trouble handling screen writes that use DOS and BIOS function calls. Zenith also sells both a standard color screen and monochrome screen adapter for the Z-170 PC, but I didn't test them for this review.

LUNCH-PAIL FIGURE The Z-170 PC's lunch-pail shape makes it unusable as a lap computer (it's too top-heavy to be stable on your knees), but its reasonable 14.5-

PC MAGAZINE FACT FILE

Zenith Z-170 PC
Zenith Data Systems Corp.
1000 Milwaukee Ave.
Glenview, IL 60025
(800) 842-9000
List Price: $2,399
In Short: The IRS made a wise choice when it selected Zenith's very serviceable, very compatible portable computer for its field agents to use—watch for one at your next tax audit!

CIRCLE 655 ON READER SERVICE CARD

THE PC PENS

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For more information and the name of the distributor nearest you, call Houston Instrument at 1-800-531-5205 (512-835-0900 if in Texas) or write Houston Instrument, 8500 Cameron Road, Austin, Texas 78753. In Europe, contact Houston Instrument, Belgium NV., Rochesterlaan 6, 8240 Gistel, Belgium. Tel.: 32-(0)59-277445, Tlx.: 846-81339.

CIRCLE 308 ON READER SERVICE CARD

*U.S. suggested retail price for PC595 model plotter. Pricing subject to change. DM/PL is a trademark of Houston Instrument.

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pound weight makes it eminently suitable as a portable tabletop machine. All you have to do is plunk it down on a handy (hopefully sturdy) table, open the keyboard/screen cover, switch it on, and get to work: The Z-170 PC will run for 2 to 3 hours on its battery pack or, if need be, you can plug it into a wall outlet using Zenith's 12-volt DC power supply (which doubles as a recharger for the battery pack). It will boot your favorite version of DOS (Zenith supplies MS-DOS 2.11, but I ran it using PC-DOS 3.2) and run most IBM PC applications without problems, and with the kind of performance you've come to expect on a floppy disk–equipped PC.

KEYBOARD Zenith's keyboard isn't snappy like IBM's, but it's not squishy like Compaq's marshmallow masterpieces either. Its feel is easy to get used to and, save for a minor problem or two, its layout isn't bad, especially when you consider the sorts of design compromises that generally go into portable keyboards. One problem is the cursor-control keys, which are lined up on the lower-right-hand side of the keyboard in an uncomfortable "left, right, up, down" order. The cursor keys' secondary functions (Home, End, PgUp, PgDn) are accessible only by pressing the Right Shift key, which seems reasonable until you use it for a while, at which point the Left Shift key seems like a better choice.

The other problem is the function keys (which, by the way, are laid out straight across the top of the keyboard—not my favorite location for them, but it does the job in a pinch). Zenith chose membrane switches for them instead of normal typewriter-style keys, and to say they're unpleasant to use is an understatement. When you press a function key on the Z-170 PC, it feels about as wonderful as poking your puppy in the eye. I avoided them like a plague-ridden flophouse.

The Z-170 PC's disk drives are one of my favorite topics. They're one-third height, 5¼-inch floppies capable of reading anything you produce on your desktop PC. The best part is that they're installed conveniently on the right-hand side of the machine. You quickly get used to which one is drive A: and which is B: and start changing floppies without even peeking around the corner.

COMPATIBILITY I ran a full complement of PC-compatible software on the Z-170 PC and ran into only one or two minor problems. *XyWrite II Plus* occasionally lost hold of its keyboard, but that's not unusual because of the program's unusual keyboard handler. *1-2-3*, Release 1A, also had problems with the Zenith's keyboard. When you view a graph (using either the /Graph menus or the F10 key), it appears for only an instant because *1-2-3* decides you pressed another key and immediately removes it from the screen. In my test, no amount of coaxing (such as removing *ProKey*, Version 4.0) would fix the problem, but switching to Release 2 of *1-2-3* did. *Microsoft Word*, Version 3.0, ran in graphics and text modes with only a very minor keyboard problem (Shift-Del doesn't work, which means you cannot delete characters without having them appear in *Word*'s scrap).

■ The Zenith Z-170 PC comes with built-in applications that can easily replace *SideKick* or any other pop-up utility.

WordStar, *IBM Personal Editor 2*, *The Norton Utilities*, *SideKick*, *PopDrop*, and a raft of *PC Magazine*'s utility programs ran without incident, except for occasional minor color problems. For example, it is difficult to distinguish *Personal Editor*'s command bar from the text area on-screen, but that is something you can adjust to, especially if you're already familiar with the program on a PC. I even persuaded IBM's *TopView* to run as successfully as it can on a floppy disk–based machine.

The Z-170 PC comes with built-in applications that can easily replace *SideKick* or any other pop-up "desktop" utility you might use. They include a calculator, an appointment calendar with a built-in alarm clock, and a telephone dialer/communications package that works with the Z-170 PC's built-in modem. The calendar and dialer use nonvolatile RAM to store your information (it can be backed up onto disk with a Zenith-supplied utility), and all programs use a permanent RAM buffer for saving the screen (don't worry, it's big enough for a high-resolution graphics screen) when you run them. The buffer can cause you some confusion because CHKDSK reports a memory total that does not include it, and you'll wonder what happened to all that memory you just paid for.

Zenith offers several options, including a hard disk, for the Z-170 PC, but I think you'll find the machine to be fully serviceable as a portable as long as you install at least 512K of RAM and no other options. Whatever options you decide on, you'll do well to equip yourself with a Z-170 PC if you have to go up against the IRS.
—John Dickinson

COUNTERPOINT

The lunch-pail configuration, twin 5¼-inch drives, and generous screen size make the Zenith a winner for most applications. The keyboard is a little rickety, and the blue backlighting works only in the worst lighting situations—I don't think it helps in normal office lighting.**—Bill Machrone**

DATAVUE 25

Like the Zenith Z-170 PC, Quadram's Datavue 25 looks like a cross between a lunch-pail and a sewing machine. While the two look alike at a glance, the resemblance is only skin-deep: the Quadram offers seven important options the Zenith machine lacks.

The Datavue 25 can be had with just about any type of flat-panel display or disk drive currently on the market. Its keyboard is both removable and wireless, and you'll be able to buy a second removable keyboard that functions as a standalone notepad computer with its own pop-up display. But most impressive is the 20-megabyte hard drive option; no one else offers internal hard disk capacity in a laptop portable (except Morrow, the Zenith machine's designer, whose functional equivalent, the

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MicroNews/Views, Nov. 85

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The gaslit screen of the Datavue 25 shines compared with most of its LCD competition, as does the array of options Quadram offers. The keyboard is removable and wireless, you can equip the Datavue 25 with a 20-megabyte hard disk or a full complement of 5¼- or 3½-inch floppy disks, and you can load it with up to 768K RAM.

PC MAGAZINE FACT FILE

Datavue 25
Quadram Corp.
One Quad Way
Norcross, GA 30093
(404) 923-6666
List Price: With 256K RAM, LCD screen, $1,695; with 768K RAM, backlit fluorescent screen, $2,295; with 1.25 Mbytes RAM, gaslight screen, $2,645
In Short: A power-packed, but still laptop-size, portable with multiple screen, keyboard, and disk drive options, including a 20-megabyte hard disk. The standard keyboard's feel is mediocre, but a fix is coming.

CIRCLE 652 ON READER SERVICE CARD

Morrow Pivot, sported a 10-megabyte disk before the company went belly up. Zenith has a 10-megabyte external hard disk option).

The Datavue 25 is no newcomer to DOS-to-go computing—it's been out since March 1985. The screen options and hard drive models, however, are new this year.

GASLIGHT DISPLAY PC Magazine Labs tested a Datavue 25 with Quadram's preferred display, a twisted-crystal "gaslight" LCD unit; its orangey-yellow-green (the exact hue depends on your viewing angle) screen was one of the three best we saw, coming in after Compaq's traditional 9-inch green CRT and the orange Grid plasma display. The contrast and intensity of the Quadram gaslight display is the best of any LCD display, period. Depending on the application, you'll have to toggle between six palette settings for the most pleasing display of gray-scale and intensity. Quadram also offers a standard LCD screen (illuminated by reflected light) and a backlit fluorescent LCD, with a grayish-white display. The backlit fluorescent screen is $300 more than a standard LCD; the gaslight is $200 higher than that. The top-hinged screens adjust slightly for better viewing angles.

For internal disk drives, you get a choice of one 5¼-inch floppy drive, two 3½-inch microfloppies, or a 3½-inch drive and a 20-megabyte hard disk. Morrow did it and Zenith probably will shortly, but Quadram seems unable to fit two 5¼-inch floppies inside, or one 5¼-inch floppy and a hard drive. However, an external 5¼-inch floppy can be attached to the back of any of the units. That option takes the hassle out of swapping data disks with the conventional 5¼-inch PC DOS format when you're on the road. For some inexplicable reason, the outboard 5¼-inch drive faces backward—you insert disks with the label away from you.

We didn't test the 3½-inch-drive units, but Quadram says they'll read and write to the IBM microfloppy format.

REMOVABLE KEYBOARD The Datavue's 84-key keyboard unclips from the system unit and operates remotely using an infrared beam. Four penlite batteries power it. As laptop keyboards go, the layout is quite acceptable: ten function keys in a row above the number keys, the numeric/cursor pad in the upper-right-hand comer, an oversize Enter key. It has none of the schizophrenia that surrounds the Toshiba T1100's layout, certainly. All the same, in a round-robin test of keyboard feel, the present Datavue ranked near the bottom.

Sometime this summer, however, Quadram intends to replace the keyboard with a more substantial mechanical version. It should also be shipping its intriguing Keystyle 80, a replacement for the stock keyboard. The front of the keyboard flips up to reveal an 8-line by 80-character LCD screen; combined with software and memory inside the keyboard, it can function as a standalone notepad and transfer files. Its price should be about $300 alone, or about $600 with the WriteStyle 80, a 6-pound, 14 cps (claimed) letter-quality printer that picks up the keyboard's infrared signals. For now, Quadram won't be selling the Keystyle 80 as an option for the Datavue 25, but rather as a second keyboard. Pity.

1.25 MEGABYTES Base units of the Datavue 25 come with 256K bytes of memory, but a cubbyhole on the side holds an expansion card for an extra two or four banks of 256K-bit RAM chips, which allows you to upgrade to 768K bytes or 1.25 megabytes of total memory. Memory beyond

COUNTERPOINT

Quadram's backlighting is second only to the plasma displays in legibility. This machine's track record shows that Quadram isn't afraid to innovate. I just hope it can make money doing it.
—Bill Machrone

Never have so many paid so little for so much.

There's a triumphant feeling that comes with buying the **Victor VPC II.** A feeling that you've found the very best IBM-compatible computer—with the best support—at the best price. It's faster yet smaller than the IBM PC XT. It runs all the same programs flawlessly. Its keyboard is comfortable rather than confusing. And it gives you every bit of memory (640K) that can be put in a PC. We've even included features that IBM offers only as options. And the VPC II gives you an option all its own: a 30-Day **Money-Back Guarantee.*** You're also guaranteed prompt nationwide service through Xerox Americare. All for as little as **$1095.** To get an even better feeling for what the Victor VPC II can do for you, or to locate your nearest Victor dealer, call Don at 1-800-248-5252.

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CIRCLE 136 ON READER SERVICE CARD

VICTOR
Scotts Valley, CA (408) 438-6680

the 640K-byte DOS limit can be devoted to a RAMdisk but not to the Lotus/Intel/Microsoft expanded memory specification, which allows bigger spreadsheets.

Just below the memory slot is a second slot for an optional Hayes-compatible 300/1,200-bit-per-second modem. A third opening is for the AC adapter or a $65 battery pack that should give 2 to 3 hours per charge with the illuminated screens. Unfortunately, the machine can't be used while the battery is being charged, but it can be run on AC, then recharged later.

In back are serial, parallel, RGB video, and composite color monitor outputs, as well as the expansion-bus connection used by the outboard disk drive. On top is a carrying handle, a nicety left off the Zenith lookalike.

The operations manual is a model of concise, useful information for users with some PC experience. In fact, the Datavue as a whole offers many features of interest to most experienced users: the ability to skip the leisurely memory checks at startup, automatic configuration of a 360K- or 720K-byte RAMdisk, a battery-power-cutoff option for the floppy drives (they get power only when accessed), a slot for an 8087 math coprocessor, and a world clock that displays local time, GMT, and the time in 23 other cities.

NICHE MARKETPLACE Like the Zenith, the Datavue 25 appears destined for a niche-within-a-niche market. It's for the person who needs an illuminated screen away from the office but who isn't willing to accept the bulk of a Compaq as the price to pay for a truly excellent screen display. With an 8087 math coprocessor installed, the Datavue can do credibly speedy *1-2-3* spreadsheet work. Because the illuminated screen is tough on the battery life, the Datavue (except in the base LCD configuration) probably isn't for someone who needs to work away from 110 volts for long stretches.

Quadram might find itself with an unmitigated success on its hands with a few minor adjustments: make the memory beyond 640K bytes available for expanded memory, beef up the keyboard (in the works), and make the standalone Keystyle 80 a modest-extra-cost option rather than a separate product.—**Bill Howard**

SHARP PC-7000

The Sharp PC-7000 is a new entry into the MS-DOS portable marketplace that offers unprecedented value. While it does not offer battery operation, the Sharp PC-7000 makes a strong case for making a laptop your second computer—or possibly even your first.

The Sharp gives you two 5¼-inch double-sided floppy drives and 384K bytes of memory (which Sharp describes as 320K "user available memory") for an unbelievable $1,795. Included as standard features are a clock-calendar chip and a serial and a parallel port (using the same connectors as an IBM PC, so your existing cables should work). You can add an RGB adapter board as an option, and Sharp has thoughtfully provided a switched .4- ampere AC outlet in the back for your monitor cord. (Speaking of cables and cords, the PC-7000 uses a standard power cord, so instead of having to remember to pack it and not lose it, I left one at the office and left another at home.)

The Sharp has a 25 by 80 backlit LCD screen (referred to as an "illuminated crystal display"), capable of 640 by 200 bit-mapped graphics. I generally can't stand an LCD screen. Having worked with a variety of portable LCD screens, I have been able to tolerate only a few. I like my Radio Shack Model 100 because the characters are large and because it has a contrast knob that lets me adjust the angle of the crystals in the display for maximum contrast.

NEW LCD TECHNOLOGY The backlight element and display are based on a new approach to LCD technology, which improves the contrast and legibility. You

PC MAGAZINE FACT FILE

Sharp PC-7000
Sharp Electronics Corp.
Sharp Plaza
Mahwah, NJ 07430
List Price: $1,795 for 384K (320K user-available) memory, two disk drives, MS-DOS 2.11; printer, $399; RGB, 255; modem $349
Requires: AC outlet
In Short: One of the best MS-DOS laptops on the market today, this compact computer still needs to be plugged in to run but offers lots of standard features, high performance, and a readable display.

CIRCLE 676 ON READER SERVICE CARD

Even if you thought you could never love an LCD screen, you may still find the Sharp PC-7000 attractive. Its LCD screens (both color options come standard) are backlit, and it's so good at being PC compatible that it may convince you that the computer you take on the road should be the same as the one you keep at home.

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IBM*

can choose between three brightness levels and between regular (black on white) or inverse display. It also has a panel that tilts forward from the bottom at the touch of a large button and a contrast-adjustment like the Model 100. The result is that the display is extremely flexible. I have worked in front of sunny windows, in a dim den in the wee hours of the morning, on a kitchen table, and in a fluorescent-lighted office: in short, anywhere I could find a square foot of space and a power outlet. Adjusting the brightness and angle helped, but being able to make the fine contrast adjustments made the difference between satisfaction and terminal frustration. The 9½- by 4-inch dimensions give it shorter and wider proportions than a CRT display, but it is large enough and sharp enough to read easily. As with any LCD, it can't display highlighted text as brighter, so you must settle for bold instead. The character set is similar to the PC Color/Graphics Adapter and is acceptable. This screen stood up to even my persnickety standards.

■ The keyboard is one of the Sharp's best features. Unlike most of its competition, it is detachable, complete with a 13-inch coiled cable.

One of the slowest performance features of the computer is its display; there is a limit to how fast you can redraw an LCD screen with 128,000 dots. Sharp solves this problem in part by redrawing from more than one line at a time. When you switch screens, you may notice the display filling both from the top and from some distance down in the middle. This is especially noticeable when scrolling on a Lotus spreadsheet. The overall effect is slightly distracting, but better than a slower display.

The backlight element evidently wears out. Sharp predicts that the screen will lose

EVALUATING THE KEYBOARDS

A good keyboard can be essential to getting the most from a portable machine. Key placement and touch are the variables—but placement is the more crucial.

The keyboards on the portable machines we reviewed are nearly as varied as the machines themselves. More than any other component, they determine how compatible a computer will be with the way you work. When evaluating keyboards, you must consider two major elements: key placement and touch. Of the two, placement is more important, because you can adapt far more rapidly to machines with a different touch. We consider emulation of the cursor controls in the standard PC keyboard to be of paramount importance. The position of the function keys is less important, but the more reminiscent the keyboard is of the PC, the more likely you are to be productive with it. Nothing is more likely to provoke frustration and obscenities than a futile search for the Cursor Down key.

A large part of your satisfaction with a keyboard will be determined by the size and positioning of the "reach" keys. These include the Shift, Ctrl, Alt, Esc, and Backspace keys. IBM did a fairly poor job with the original PC keyboard; a much better job with the AT keyboard. The AT's Esc key still causes gripes: Most experienced users expect to find it in the upper left corner of the typing area, not the numeric pad.

THE ELEMENT OF TOUCH The touch of a keyboard is determined by several things: the key travel, resistance, tactile feedback, shape, dishing, and sculpting. It's easy to get overtechnical in describing key travel, but a good keyboard generates its characters at the midstroke point. That design prevents you from generating unwanted characters by "tickling" the keys. It also gives you overtravel, the distance from the character generation to the end of the key's travel. The board supporting the keys should not flex as you press on the keys; the landing should be firm.

IBM has trained users to expect an over-center click at the point at which a character is generated, a throwback to typewriters and keypunch machines. Throwback or not, it is reassuring. Many users claim, however, that they can type faster on machines with light springs, short travel, and no click. For the keyboard virtuoso, these machines encourage more of a legato keyboard style, more like playing an organ than a piano.

The final factor is rollover, or the number of keys you can press simultaneously without confusing the machine. A machine with *n*-key rollover records all the keys you press, in the order you pressed them, no matter how many are down at the same time. A machine with two-key rollover records only the first two strokes; all subsequent ones are ignored. While it's unusual for a typist to press more than two keys at a time, I've seen many users start *1-2-3* by rolling down the 1, 2, and 3 keys with their ring, middle, and index fingers.

PROS AND CONS Without dwelling on the details any longer, let's look at the major pros and cons of our keyboard collection:

The IBM PC Convertible's keyboard shows some honest research into ergonomics. The cursor keys are separate, and while they don't emulate the PC keyboard's, they are eminently usable. Keys have an over-center click and good overtravel.

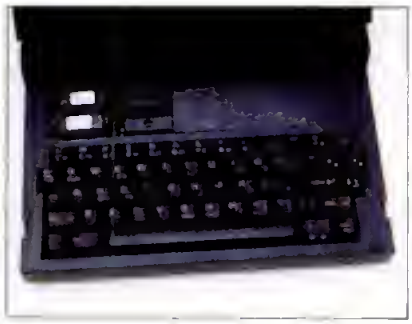
The Toshiba T1100's keyboard is flawed by the designers' inability to deal with the IBM keypad and cursor controls. Otherwise, it's a nice keyboard.

Quadram took a different tack with its Datavue 25, displacing the numeric key-

Toshiba T1100

IBM PC Convertible

Kaypro 2000



Gridcase 3

Zenith Z-170 PC

Datavue 25

Sharp PC-7000

Compaq Portable II

Panasonic Exec. Partner FT-70

pad upward and to the left. Despite the sense that your right hand is lost in a forest of keys, you can adapt quickly to this layout. Because this is an infrared keyboard, there is no rollover. There is also no cord.

The Gridcase 3 was obviously not designed with IBM-compatibility in mind. The IBM key functions are grafted onto an otherwise excellent keyboard, despite the dismal two-key rollover. Grid should have remedied this problem last year when it redesigned the Gridcase 3.

The Zenith Z-170 PC keyboard is a little too flexible for power typists. It bends under hard typing. The feel isn't bad, but some of our reviewers objected to the membrane function keys.

The Compaq Portable II's keyboard is full-size and full-function. It's easy to adapt to the function key location, and the keypad is home sweet home. IBM diehards won't like the rubber-dome technology, but it gives an over-center feel, and it's quiet and light.

The Panasonic Exec. Partner FT-70's keyboard is dished and sculpted, with a light touch and fast action. Its function key placement is acceptable, the keypad mimics the IBM standard, and the "reach" keys are conveniently oversized.

The Kaypro 2000 folds the numeric keys into the typing field. Key placement is otherwise OK. A secondary function key shifts the meaning of the cursor keys to PgUp, PgDn, Home, and End. This idea was good enough for IBM to borrow for the Convertible.

The Sharp PC-7000 keyboard has a full-blown numeric keypad, a light, quiet touch, and a place to hold function-key labels. The three "lock" keys are even illuminated. It's a lot like the Compaq keyboard.—**Bill Machrone**

DOS to Travel: Summary of Features

Product	List price (min. conf.)	Measurements: Weight (lb.)	Measurements: Size* (H × W × D in inches)	Screen: Size (H × W in inches)	Screen: Type	Screen: Readability	Screen: Contrast	Screen: Hor/Vert† (deg.)	Keyboard: Feel	Keyboard: Roll-over	Portability: Battery discharge time (hr.)	Portability: Battery recharge time (hr.)	RAM size: Minimum	RAM size: Maximum	RAM size: As tested
Toshiba T1100	$1,995	9.08	2.5×11.8×12	4×9	LCD	VG	VG	110/30	G	0	6.7	8	512K	512K	512K
IBM PC Convertible	$1,995	12.5	2.7×12.8×14.7	4×10.5	LCD	VG	VG	110/30	VG	0	120-volt only	N/A	256K	512K	512K
Kaypro 2000	$1,995	12.82	2.3×13×11.5	4×9	LCD	VG	G	110/30	G	0	4-6	24	768K	768K	640K
Gridcase 3	$5,505	13.44	2×11.5×15	4×9.5 diag	Plasma	E	E	150/150	E	2	1–1½	12	128K	640K	640K
Zenith Z-170 PC	$2,399	14.48	9.5×12.6×8	4.5×9.5	Backlit LCD	VG	G	110/30	F	4	2–3	8	256K	640K	512K
Datavue 25	$1,695	16.23	10.5×12.8×6.3	5.5×11.5	LCD: backlit fluorescent or gaslight	VG	E	110/45	F	1	1 (lit) 2 (no backlight)	6–8	256K	1.25 Mbytes	768K
Sharp PC-7000	$1,795	18.51	8.5×16×8	4.5×9.5	Backlit LCD	G	F	110/50	VG	0	120/220-volt only	N/A	384K	704K	384K
Compaq Portable II	$3,499	26.96	7.5×17.5×13.8	5.5×7	CRT	E	E	150/150	VG	0	120-volt only	N/A	640K	8 Mbytes	640K
Panasonic Exec. Partner FT-70	$2,595	30.39	5.3×16×21.3	6×7.5	Plasma	VG	G	150/150	G	0	120-volt only	N/A	256K	640K	256K

*All laptops measured with case closed E—excellent VG—very good G—good F—Fair N/A—not applicable †Indicates two arcs extending to the left and

half its brightness after 1,000 hours of use at full brightness. Rather than keep you on a short leash from the service department, Sharp made it easy for you to replace the element yourself (for $49 list per element). You can simply swing the bottom of the display panel up and away from the computer, then disconnect some wires, slide out the element, slide a new one in and hook it up, drop the panel, and power up. The first time, it took me less than 2 minutes to make the switch. The designers didn't stop there, either. Don't like the "white" display? Fine, just put in the green element next time. (Look out, however, the green display is an electric, Day-Glo lime that is not for those of weak constitutions. I prefer the white.) Sharp deserves a special commendation for respecting the abilities of its users in this part of the design.

SCREEN STANDBY LIGHT Another feature you will soon discover is the "Screen Standby" status light. If you don't press a key within a certain length of time, the backlight element switches off (to prolong its life). You can select the delay (from 2 minutes, to 5 or 10 minutes, or forever), depending on how long your ruminative pauses last. When the time limit is passed, the screen darkens and a little message light appears in orange above the green power light to the right of the screen. Just press any key (even Shift), and the screen springs back to life.

■ Since the PC-7000 uses an 8086 running at 7.37 MHz, you would expect it to run fast. Our benchmark tests bear this out.

The front panel has two other indicators. The two floppy disks are mounted on the right-hand side out of sight. Because of this design, disk activity indicators would not make much sense in the traditional locations. Instead, they are part of the front-panel display, winking green LEDs on and off as they are accessed. The two Canon drives are so silent that without the status lights you wouldn't know anything was happening. Incidentally, the two half-height drives are custom-built into a single housing, so you can forget about pulling one and dropping in a hard disk in its place. (There are some other fatal drawbacks to such an idea, as you will see.)

The keyboard is one of the Sharp's best features. Unlike most of its competition, it is detachable, complete with a coiled cable that is a useful 13 inches long (contracted length). The keyboard itself is full-size AT-style, except that the function keys are arranged along the top left edge. It is 16 inches wide and 7 inches deep, complete with two-level legs to give you a choice of angles. It has indicator lights on the Caps-Lock, NumLock, and ScrollLock keys. The standard size and layout of this key-

Hardware configuration				Built-in communications		Vendor-supplied software	
Built-in disk drives	Expansion slots	"Dockable" or otherwise attachable equipment		Modem (bps)	Serial port	Disk-based applications	ROM-based applications
1 3½" floppy disk	None	5¼" floppy disk drive(s), 3½" floppy disk drive(s), CGA-compatible color or composite monitor, modem, serial port		300	Yes	None	None
2 3½" floppy disks	1 proprietary	CGA-compatible color or composite monitor, printer, modem, serial port, parallel port		1,200	No	Editor, communications	None
1 floppy disk	1 proprietary	5¼" floppy disk drive(s), 3½" floppy disk drive(s), CGA-compatible color or composite monitor, parallel port		300/1,200	Yes	Editor, communications, database, BASIC	None
1 3½" floppy disk	1 combination	5¼" floppy disk drive(s), 3½" floppy disk drive(s), hard disk, CGA-compatible color or composite monitor, printer, modem (internal), serial port, parallel port, IBM keyboard		300/1,200	Yes	None	None
2 5¼" floppy disks	1 proprietary	Hard disk, CGA-compatible color or composite monitor, monochrome monitor, serial port, parallel port		300/1,200	Yes	BASIC	Communications, appointment calender
1 hard disk 2 3½" floppy disks 1 5¼" floppy disk	1 proprietary	5¼" floppy disk drive(s), CGA-compatible color or composite monitor, printer, modem, serial port, parallel port		1,200	Yes	None	Communications
2 5¼" floppy disks	2 proprietary	Hard disk, printer		1,200	Yes	None	None
1 hard disk 1 5¼" floppy disk	2 PC bus-compatible	Modem, serial port, parallel port		None	Yes	BASIC	None
1 hard disk 2 5¼" floppy disks	1 short PC bus-compatible 1 proprietary	Internal hard disk, printer, modem, serial port		None	No	None	None

right of and above and below the screen's center point that define the angles from which the screen is legible.

board make it easy to use, and the detached design permits the flexibility required in many situations. Its only shortcoming is that it has a very light touch and offers little or no resistance. I'm not a world-class typist, but my error rate goes way up on this keyboard.

Inside, the machine boasts a motherboard with an 8086 to drive the works. It has only a few options available, but you are invited to install them yourself. You can bring the memory up to 704K bytes simply by plugging in 4 by 64 256K chips, and you can add an internal 1,200-bit-per-second direct-connect modem, in addition to the RGB board mentioned above. There are little knockouts that you can remove to give access to the new connectors as you add them. You can also add an 8087 coprocessor if you want. You can't add IBM cards, however. For that, you must get an expansion unit, which would seem to defeat the portability advantages. Still, with the two ports, a modem, and a color monitor, you probably won't need much more. If you want a printer, Sharp also has a 11.4-pound dot matrix designed to hang on the back of the computer, but we did not test that as part of this review. (As just another example of thoughtful engineering, the PC-7000's handle can be put in either of two positions: one that is balanced for the computer by itself, and another that is balanced when the printer is on the back.)

SMALL YET HEAVY Another small drawback is that the PC-7000 weighs in at almost 19 pounds. It is so small, however, that you might not believe that it weighs so much until you actually put it on a scale. At 16 inches wide, 8½ inches tall, and 6½ inches deep, it is smaller than most portable "boom box" stereos. It might get to be a drag if you had to carry it with a suitcase, briefcase, suitbag, as you run from one airport gate to another. In most circumstances, however, the weight will probably not be a problem.

All this weight is not without good cause; the PC-7000 is densely and efficiently designed. A steel chassis forms the internal skeleton, and the power supply (with cooling fan), the shock-mounted disk drives, and the motherboard are securely fastened to its surface. The overall impression under the hood is one of thoughtful and professional preparation.

The documentation is also compact and well designed. The operation manual is printed on loose-leaf pages in a typical binder with slipcase. It uses two-color printing and plenty of clean illustrations to make the many features of the system clear. The manual also contains information on all the different options, so that you can see just what you are in for when you

COUNTERPOINT

The Sharp is solid. It feels well-made, a precision machine. It sits, however, in an uncomfortable weight/size niche between the lighter lunchbox machines and the full-featured Compaq Portable II. I like the interchangeable screen backlights, but the overall contrast could be better.—**Bill Machrone**

install the options yourself. A separately bound paperback manual explains MS-DOS and is apparently the standard Microsoft text with some additional instructional sections written by Sharp. While it suffers from some of the same problems as IBM's manuals (it's difficult to become an expert on DOS just by working with manuals), the documentation as a whole is about as good as you will find.

The PC-7000 comes with MS-DOS 2.11, but BASIC is not included. It's available as an option for $65. I tested it with a GW-BASIC provided with an AT&T 6300, and it ran without a problem. It will also boot PC-DOS 2.1 without any apparent trouble, although you cannot access the built-in clock-calendar.

THE SETUP UTILITY SetUp is a nifty utility in ROM that lets you get at most of the parameters of the system with the press of a single key. Through it you can adjust the screen brightness and Screen Standby delay parameters, the time and date, the COM port settings, the size and blink rate of the cursor, and much more. You can even set the speaker volume or slow down the processor speed (in case you run into a time-sensitive program).

Since the PC-7000 uses an 8086 running at 7.37 MHz, you would expect it to run fast. Our benchmark tests certainly bear this out. *The Norton Utilities*' SysInfo utility brought home the fact that this machine is not completely compatible with the IBM since it came up with a rating of 0.0 (an IBM PC rates 1.0, and faster machines have higher ratings). The manual mentions that there are newer BIOS ROMs available; perhaps these would perform better with SysInfo. The benchmarks showed that the disk drives were not as high speed as the brains of the operation; they performed at the same speed or slightly slower than the PC standard drives.

In terms of software compatibility, the Sharp handled everything I threw at it. It ran *XyWrite II Plus* without complaint, along with *PC Write*, *Enable*, *SuperCalc3*, *1-2-3* (Version 1A), *Framework II*, *SideKick*, and *Crosstalk*. The screen can be set to emulate either the Monochrome or the Color/Graphics Adapters through SetUp, so you should be able to get just about any program configured to run on it. The only way I could crash it consistently was to get my PC-DOS COMMAND .COM files mixed up with the Sharp MS-DOS, but mixing operating system files is enough to addle any processor's brains.

I was initially intrigued by the Sharp's price but was fully prepared for another illegible display and another near-miss. Instead I found a useful machine that rapidly made its value apparent. This is one that I just have to buy.—**Alfred Poor**

COMPAQ PORTABLE II

In almost every way imaginable, Compaq's newest entry, the Compaq Portable II, is in a class by itself among the machines reviewed in this issue. Yet it belongs in this survey: when it comes to taking DOS along, more people have accepted Compaq's solution than any other. And it's not even the heaviest machine we reviewed (the Panasonic Exec. Partner is). While significantly smaller and infinitely more desirable than Compaq's old Portable, the Portable II is still the largest machine we reviewed. It is also the fastest, has the most storage capacity and the most readable screen, and is the most PC-compatible. Alone among the entrants, it has both PC-compatible and AT-compatible expansion slots.

There's no way the Portable II will ever be battery powered, unless you're planning to bring a Diehard along. It comes complete with an 8-MHz 80286, a 20-megabyte hard disk, and a single 5¼-inch floppy drive. It has 640K on the motherboard, is AT-compatible, and can take some of the high-tech expansion boards

PC MAGAZINE FACT FILE

Compaq Portable II
Compaq Computer Corp.
20555 FM 149
Houston, TX 77070
(713) 370-0670
List Price: Model 1 (one floppy disk drive), $3,499; Model 2 (two floppy disk drives), $3,599; Model 3 (one floppy and one 20 Mbyte hard disk drive), $4,799
Requires: AC outlet.
In Short: The most common solution to DOS-to-travel, it offers high degree of compatibility, the greatest storage capacity, and fastest operation.

CIRCLE 637 ON READER SERVICE CARD

This machine further enhances Compaq's reputation for setting the standards for larger (and heovier) computer-in-a-suitcase machines. The Portable II offers full AT compatibility, Compaq's standard dual-mode screen, a 20-megabyte hord disk option, and gold-ploted IBM PC compatibility. Like its predecessors, the Compaq Portoble II is in a class by itself.

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Built-in 5-1/4" drive and RAM drive software lets you swap 5-1/4" floppy disks between your Datavue and other PC's. You can expand Datavue's 2-drive system even further with an additional add-on floppy disk drive.

The small computer that's big on features.

Datavue features a detachable low-profile sculptured keyboard with that IBM-type touch and 10 function keys for special software. Its cordless infrared operation doesn't tie you down.

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Datavue is no bigger than your briefcase.

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CIRCLE 535 ON READER SERVICE CARD

such as Intel's AboveBoard AT and AST's Advantage. The screen, of course, is Compaq's standard dual-mode monitor. It gives you crisp monochrome-style characters for word processing, and PC-compatible Color/Graphics Adapter emulation in shades of green for graphics tasks. A Ctrl-Alt key combination switches you back and forth between modes.

TRIMMED DOWN Our test machine weighed in at 26 pounds with the 20-megabyte hard disk installed. While the weight saving over its predecessors is significant, the reduction in bulk is at least as important for easier transportability. You don't have to bargain with people on 727s to get aisle seats anymore. The Portable II slips gracefully under the tightest seats and is far less a threat to life and limb when it goes into the overhead luggage rack. Of course, since it's AC powered, there it must stay. When it gets to where you're going, though, the Portable II doesn't take a back seat to anything else.

About the biggest difference between the Portable II and a PC is the keyboard. The Portable II's keyboard layout strongly resembles the AT's, except for the function keys. They are arrayed across the top of the keyboard, a relatively minor departure considering the liberties that some of these machines have taken. Most important, the keypad is exactly as you would find it on a standard PC. You don't need to relearn the cursor controls.

COUNTERPOINT

Okay, okay, so it's a little smaller and lighter and includes a 286 processor with full AT compatibility. But Compaq's new computer-in-a-suitcase sports the world's mushiest keyboard, a small and fuzzy screen that features record-holding phosphor delay, and a cover design that makes it so difficult to open and set up that your manicurist will send Compaq president Rod Canion a telegram thanking him for the increase in business. Besides, you can't use it on an airplane or train.

No thank you, Compaq. Not yet anyway.—**John Dickinson**

MODEL COMPATIBILITY Given Compaq's long history of compatibility, it's no surprise that the Portable II ran everything I threw at it. I tried several different modem cards, including the Hayes 1200B, AST's Reach, and the Qubié 1200. I tried a variety of software, including *Crosstalk*, *PFS:Access*, *Ascom*, and *Microsoft Access*. Everything ran without a hitch.

I tried a couple of AT-style extended memory cards as well, including RAM-disk software. I encountered no problems, even at the Portable II's 8-MHz clock rate. As always when swapping cards in any of the newer Compaqs, I cursed the designer who specified the star-headed screws instead of the more sensible hex or Phillips heads. The very least Compaq could do is give you a screwdriver or wrench with a matching bit. I've got the tools, but how many average businesspeople do? If Compaq has its way, I guess a lot will buy them.

The rest of the testing, with various software packages, was anticlimactic, even boring. But then, that's the way compatibility testing should be. The last thing you want is surprises as you run different packages. Indeed, the Compaq is so deeply ingrained in the marketplace that some products, such as *1-2-3*, have special installation routines that get the most out of the monochrome and graphics modes.

HARD POWER The hard disk on our test machine added to our pleasure. It made all the difference in performance and underscored the essential slowness of floppy disks. The hard disk also unleashes the power of DOS. The megabytes of storage mean a rich collection of batch files, subdirectories, utility programs, and other niceties that make working with a PC so convenient and productive.

Although the Portable II is available with floppies only, I don't recommend that configuration. Except by giving up one of the two expansion slots to a hard disk card, you'll have a tough time upgrading to a hard disk if you want to do so in the future. Compaq has moved most of the controller electronics off the PC-style expansion card and put them onto a daughterboard attached to the hard disk. This design saves space but limits your flexibility. Of course, if Compaq really wanted you to do it yourself, it wouldn't have used those star-headed screws.

The Portable II is one of two (the Gridcase 3 is the other) machines to offer 80287 support. If you solve engineering problems or run sophisticated mathematical models in the field, this feature could be significant. Coupled with the Portable II's compatibility with expanded and extended memory cards, you'll never have to apologize for its capacity. Its high degree of compatibility makes this machine hard to write about at length. If you know how to use a PC, you're already oriented to the Portable II—but that's the idea.
—**Bill Machrone**

PANASONIC EXEC. PARTNER FT-70

The Panasonic Exec. Partner FT-70 has as nice a display as anyone could want, includes a good assortment of standard features, and is about as portable as your average 3-year-old child.

For all the fine things that the Panasonic Exec. Partner is, it is quite clearly not a laptop. I've yet to see the lap that could hold the Panasonic, and I hope I never will.

Superficially, it resembles a laptop computer, but it is in the weight class of the Compaq Portable and other transportables. At 30 pounds, only the strong, determined, or foolhardy would carry this computer for any distance.

Its design presents an additional problem for taking this machine on the road. The Exec. Partner is very long (21¼ inches), and it's not particularly stable when stood upright, so that it's difficult to put it down without being concerned that it will

COUNTERPOINT

I'd forgotten just how big the Executive Partner really is. It's a monster compared with some of these machines. But it packs two 5¼-inch drives and a decent printer. The screen is legible, and the keyboard is a delight.
—**Bill Machrone**

Given new competition, the oversized Panasonic Exec. Partner FT-70 doesn't seem as portable as it once did, but its gas plasma display, dual-speed 8088-2 microprocessor, and excellent expandability and compatibility make it tempting as a Compaq Portable II alternative. Its built-in printer is a bane or a bonus, depending on how you feel about the extra weight, its low-end print quality, and the desirability of packing a printer when taking DOS on the road.

PC MAGAZINE FACT FILE

Panasonic Exec. Partner FT-70
Panasonic Industrial Co.
One Panasonic Way
Secaucus, NJ 07094
(201) 348-7000
List Price: $2,895
Requires: AC outlet.
In Short: Although the Exec. Partner is too bulky and heavy to be easily portable, features such as a truly legible screen and a dual-speed processor make it a worthwhile machine.

CIRCLE 653 ON READER SERVICE CARD

fall over. But once you get over the desire to use the Exec. Partner on an airplane (or anywhere else you'd need battery operation; it needs to be plugged into an AC outlet), you may find much to recommend this machine.

STRONG ON BASICS The basic Exec. Partner (the model FT-70, manufactured by Matsushita) includes 256K RAM (expandable to 640K), two half-height 5¼-inch disk drives, a built-in thermal printer, serial and parallel ports, and, most impressive, a high-resolution 11-inch plasma display and a dual-speed 8088-2 CPU that runs at 4.77 and 7.16 MHz.

The plasma display is beautiful, with crisp, well-formed letters. Not only is it easy on the eyes, it's readable under any lighting conditions. And it scrolls without any trace of flicker. The overall resolution is 640 by 400 pixels, although with most software it will only emulate the IBM standard of 640 by 200 (monochrome) or 320 by 200 (color graphics). If you've never seen a gas plasma display before, the orange-on-orange screen might be a bit distracting initially, but you'll quickly get used to it and find it a pleasure to work with.

The display lacks a brightness control and a contrast control and won't adjust any farther back than 90 degrees, but these are only minor problems because of the plasma's excellent contrast. The display's one small quirk is the way it treats colors: Panasonic has assigned various colors to different fonts (such as italic, bold, and roman). This method works, although it sometimes results in a pastiche of type styles on the screen. The ability to emulate the IBM monochrome mode and get true underlining would be a nice option.

You can toggle the dual-speed processor from the keyboard by pressing Ctrl-

PORTABLE DISK DRIVE

Your Tandy 100 or NEC 8201 becomes a complete computer with our battery powered disk drive. Comes with POWR-DISK software from Acroatix. Holds 100k per 3.5" disk. Allows saving and loading directly from TEXT to disk-load and save with BASIC commands, and more.

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NEC 8201, - $199

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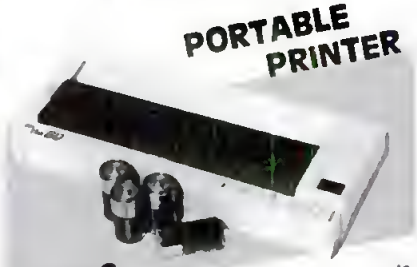

$149

The On-The-Go printer is less than 3 pounds (with batteries), yet its quiet thermal mechanism can run at 40 cps for two hours on battery power! Get shadow printing, underlining and four character types including condensed (160 characters per line—perfect for spreadsheets). Parallel interface lets it plug into everything from Apples to Zeniths.

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8k Tandy 100, NEC 8201 $29/3, $75
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CIRCLE 319 ON READER SERVICE CARD

PC MAGAZINE EDITOR'S CHOICE

And the machine of choice in the DOS-to-travel category is . . . none of them! As good as the features were on many of these machines, we found at least one significant shortcoming in each. In terms of computing power per cubic inch, nothing beats the Toshiba T1100, which defeats itself with its key layout.

At the other end of the spectrum, nothing can match the Compaq Portable II for sheer power, but it's a victim of its technology. You're making a 26-pound commitment each time you head out on the road.

The IBM PC Convertible is sleek and stylish, but putting a printer on the system bus is stupid, as is the proliferation of "slices" for port expansion.

Finally, it's easy to like the Zenith Z-170 PC and Qnadram's Datavue 25. Both are honest, workmanlike machines that won't stretch your arm or your budget. But they're still too heavy and definitely not for laptop use.

Alt-Plus. The high-speed mode rates a 1.7 on *The Norton Utilities* SysInfo test and works with all of the software I tried. You can toggle between modes while in the middle of an application if you want to or if you need to for reasons of compatibility. Otherwise, once you try out the faster speed, you'll never want to go back to the slow clock speed again.

The Panasonic keyboard is particularly firm and sturdy. It is arranged in the standard IBM style, with a few exceptions. The function keys are aligned in a single row at the top of the keyboard, four keys have LED indicators (CapsLock, NumLock, Fast Speed, and External printer), and a few keys are oversized (Return, Shift, and CapsLock).

The Exec. Partner's disk drives perform well despite a higher-than-normal noise level. The disk-drive doors are poorly designed, however; it's occasionally difficult to close them. This drawback is minor, but it becomes irritating if you swap floppies frequently.

VERY COMPATIBLE One issue you won't worry about is software compatibility. I ran *SideKick*, *dBASE II*, *WordStar*, *WordPerfect*, *1-2-3* (Release 1A), *Crosstalk*, and *XyWrite* with no problems whatsoever. Only the lack of extra memory in the 256K review unit prevented me from testing more memory-hungry products like *Framework II*.

Hardware compatibility is another story. The Exec. Partner has no RGB connector (or even a monochrome one) for an external monitor, and it can only accommodate short internal expansion boards (less than 6 inches long). Neither of these drawbacks is insurmountable: since neither the keyboard nor the plasma display is detachable, using an external monitor would be a bit tricky anyhow. The capacity for full-size cards would have been nice, but more and more options are available on short cards these days.

HOT PRINT The thermal printer is a mixed blessing. It supports both thermal transfer (with a special ribbon) and direct thermal (no ribbon but special paper) printing. Like most thermal printers, it is slow but steady with fairly good quality; it will accept any screen graphic dump. The thermal roll paper provided with the machine doesn't travel with the computer itself; you must carry it separately and attach it when you are ready to print. This makes the unit even less portable. While the Exec. Partner's integral print capability is a nice extra, it makes an already heavy unit even larger and heavier. Unfortunately, you have no option here: if you buy the Exec. Partner, you buy the printer.

The Exec. Partner has its drawbacks, but, depending on how you plan to use the machine, none of them are intolerable. On the positive side, the Exec. Partner performs extremely well, especially in its high-speed processing mode. The display is fantastic, and the machine's construction is rugged and solid. At a list price of $2,595, the Exec. Partner is a fair value for what you get: a transportable computer that doesn't sacrifice screen legibility, keyboard feel, or performance.

—Jon Pepper

Advanced Authorized Dealers

(Eastern U.S.)

Aardwolf Microsystems
217 East 85th, Suite 102
New York, NY 10028
212/538-7840

Advanced Information Systeme, Inc.
1336 Edna S.E.
Grand Rapids, MI 49507
616/243-1312

Corporete Micros, Inc.
333 West 52nd St., Suite 1204
New York, NY 10019
212/315-2853

Crest Systeme, Inc.
2101 Magnolia Ave., Suite 208
Birmingham, AL 35205
205/328-4882

Fast Forward, Inc.
129 Adams Street
Louisville, KY 40206
502/589-0301

ICS Software
P.O.C. 359015
Brooklyn, NY 11235
718/743-4050

INACOMP Computer Centers
700 Remmington Road
Schaumburg, IL 60195
312/519-1900

Micro City Computers
110 West 31st Street
New York, NY 10001
212/563-6110

Mitech Corporetion
#1 Perimeter Park South, Suite 335-S
Birmingham, AL 35243
205/967-0605

Moduler Menegement Systems, Inc.
451 Bloomfield Ave.
Caldwell, NJ 07006
201/228-3838

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1800 Century Blvd., Suite 770
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404/633-3900

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3419 Pierson Place
Flushing, MI 48433
313/732-6340

PRISM Computer & Conealting Servicee, Inc.
2100 Riverchase Center, Suite 420
Birmingham, AL 35244
205/988-5111

Southeeetern Systeme, Inc.
619 East Price Ave., Suite #12
Gastonia, NC 28054
704/866-8048

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0386E

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CIRCLE 394 ON READER SERVICE CARD

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Introducing the only Enhanced Graphics Adapter with PCturbo™ speed.

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Everyone else rushed their EGAs to the market, but Orchid Technology took the time to do it right. Orchid's TurboEGA™, from the *inventors* of PC TurboProcessing, packs a high-speed Turbo and an EGA into one slot, for the world's fastest EGA.

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Pick up the phone and find out how you can have the EGA the competition wishes *they* had: Orchid's TurboEGA, the world's fastest.

If you have an AT or a system with 80286 speed, ask about the Orchid EGA™—four graphic-card compatibility in one slot.

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CIRCLE 492 ON READER SERVICE CARD

TAPE AND DISK:

Storage with a Safety Net

An external combined hard disk and tape backup system has much to recommend itself. Along with the benefits of a hard disk—vast on-line data and program storage capacity and high speed—you get the security of easy-to-use, economical tape backup, whose reliability is proven.

External mounting means that you can keep modifications to your PC, XT, or AT to a minimum. You don't have to put any of your floppy disks out to pasture. And you can avoid worries about power or about heat buildup inside your system unit. In fact, a few combined units go even further and add their own extra expansion space so that you won't have to worry about running out of slots inside your PC.

Because they are not limited to the confines of the PC's interior, these combined units can be virtually any size or shape that their manufacturers desire. Free from the worries involved in internal mounting, manufacturers can build combined units around almost any sort of computer components available. Tough minicomputer-style 8-inch hard disks, for instance, can bring the benefits of data-security-at-all-costs engineering to the humble PC.

Along with the benefits come a few problems, however. And the biggest of these is selection. With more options available to the designer, the number of genuinely different units to choose from—and the confusion involved in choosing—is much greater.

Complicating selection is these systems' dual nature. Not only must you consider the abilities and weaknesses of both halves separately, but you must also judge each on how successful it is in marrying the complementary technologies.

PC Magazine Labs took an in-depth look at the current crop of these wonder units. We designed a rigorous test procedure and two new benchmarks to evaluate all aspects of their performance.

The results were surprising.

Our plan to rigorously test and review hard disk/tape backup units in PC Magazine Labs led to consternation and distress in some quarters—and to interesting results for the units reviewed.

Some units gave even experienced PC Labs reviewers difficulties in setting up. One manufacturer wasted 2 days' time and sent an unnecessary replacement unit because its technical support staff gave the reviewer erroneous installation information. Most systems failed in their compatibility with all of DOS's features when one benchmark explored the fringes of the tree-structured subdirectory system.

The dropout rate among manufacturers—once they got wind of the rigors of the PC Labs tests—was alarming. Quite a few of the systems submitted for evaluation were withdrawn before the conclusion of testing. Thus, the units reviewed here are not so much the cream of the crop as the survivors, the systems made by manufacturers with enough confidence in their products to allow them to go through our no-holds-barred evaluation.

Nevertheless, these survivors offer a broad selection of features, abilities, and benefits that only external combined mass storage/backup units can offer. One of them quite likely is the perfect choice for securely expanding your system.

—Winn L. Rosch

Flat-Pak 20/60

The Flat-Pak 20/60 subsystem was designed to pack large-capacity data storage and backup media into a small cabinet. On this count, the Flat-Pak scores very well: you get 20 megabytes of hard disk space and 60 of tape backup in a unit 1 foot square by only 2 inches high. (The drive and tape unit are half height.) Placed on top of your system unit, the Flat-Pak takes up no desk space, while raising your monitor to perfect viewing height. The software that controls tape backup is simple to operate, yet powerful in the scope of its commands. And Flat-Pak may be used to upgrade a PC, XT, or AT.

Sounds like a dream, right? Well, it is—once you get past the nightmare of installation, which had me thrashing about for half a day. If you are at all squeamish about opening your PC's cover, consider the installation of the Flat-Pak a job for a qualified technician. With installation out of the way, the system will appeal to the nontechnical businessperson who needs more power in a hurry.

Photographs: Les Morsillo

The Sysgen Flat-Pak 20/60 may not be top of the line, but of the units tested and reviewed here, it is the Editor's Choice for price/performance value, thanks in part to its innovative automatic backup capability (and in spite of its difficult installation).

DIFFICULT INSTALLATION You may install the Flat-Pak's hard disk as either primary or secondary, so you may opt to boot from the Flat-Pak or your original drive C:. The option is good, but it confuses installation. The Flat-Pak comes with two heavily shielded ribbon cables emerging from its rear: one for the hard disk and one for the tape backup unit. The latter connects to the tape drive controller card (half length). The former connects to the hard disk drive controller card (full length), though not directly.

Sysgen includes a special ribbon cable that attaches to the hard drive card (in more than one place) on one end and the Flat-Pak's cable on the other. If you follow the directions in the manual for folding the ribbon cable over the top of your boards, you will likely jam it when replacing your system unit cover. I did, cleanly severing one of its wires and exposing another. I later wised up and routed the cable out a spare slot opening.

After several hours with the manual and another 4 or so of experimentation, I gave up and called Sysgen's technical support staff, which turned out to be extremely helpful, understanding, and knowledgeable. The company even admitted the difficulty of installation, assuring me that the procedure is being revamped as we spoke. Following verbal directions, I got the unit up and running within half an hour. At press time, Sysgen announced a revised manual, which should address the installation difficulties.

THE GOOD NEWS The rest of the story about the Flat-Pak is good news, perhaps even great: everything about it works reliably, and the tape drive software is extremely flexible. What's more, a novice can drive the software from the easy-to-use prompts while the experienced user can enter commands directly from the DOS prompt or into batch files.

The tape backup drive, which seems to be more than half the reason to invest in a subsystem like the Flat-Pak, stores 60 megabytes on DC-600A ¼-inch tape cartridges. The software allows you to perform both image and file-by-file backups, manually or automatically. Batch files for backing up specific files can be set to run at particular times of day on particular days of the week, though not in the background—you must relinquish control of

the computer at the appointed audio signal if you wish the automatic backup to occur. Still, this is an excellent feature, and the software facilitates its setup.

You can specify that file-by-file backups and restorations include only files from or to a certain date or time, all files within a directory, an entire volume, certain file specifications, or modified files. You can also specify that hidden and system files be omitted. Plenty of well-documented examples are included in the well-written manual, which you will only need for reference if you run the software in prompt mode where you are stepped through a series of questions.

The system worked perfectly in all the PC Magazine Labs tests except the last one, in which it failed to perform a file-by-file backup of the hard disk filled with a complex subdirectory structure by the SCATTER benchmark test. The screen reported "Operation Error: Too many files to fit in a single saveset."

The most important concern, of course, is restoring files. The tape drive did not need to reread or write one sector in all my tests, and it will restore files to disks and directories other than whence they originated.

The Flat-Pak would seem an ideal solution to many a busy PC/XT/AT owner, if the difficulty of installation or the price were of no concern. Still, the combination of 20 megabytes of hard disk and 60 for tape backup is very appealing in such a space-saving subsystem, and I watched both drives perform flawlessly. Well, almost flawlessly, but few people use that many subdirectories, anyway.

Perhaps the best impression I can leave you with is this: I imagine the Flat-Pak sitting beneath my monitor as I write this review, and I like the picture I see. Now that I know how to install the Flat-Pak, I want it.—**Phil Wiswell**

PC MAGAZINE FACT FILE

Flat-Pak 20/60
Sysgen Inc.
47853 Warm Springs Blvd.
Fremont, CA 94539
(415) 490-6770
List Price: $2,095
Requires: 192K RAM, 130-watt power supply, hard disk controller card, DOS 2.0 or later.
In Short: A highly reliable unit with 20 Mbytes of hard disk space and 60 Mbytes of tape backup. It suffers only from an extremely difficult installation procedure.
CIRCLE 631 ON READER SERVICE CARD

FileSafe Combo Series 7000

The Mountain Computer FileSafe Combo Series 7000 may not scale any new peaks in performance, but it has certainly reached a pinnacle in dependable file backup. Its sterling asset is its comprehensive yet simple user interface, which accommodates individual preferences on how to back up and restore. The Combo, which combines a 60-megabyte tape drive and a 20- or 40-megabyte hard disk, may be the perfect choice for those looking for versatility as well as simplicity.

The hard disk uses the ST506/412 interface, a stepper motor actuator, and an oxide media film. These specifications are old hat compared with evolving new media and high-performance disk actuators. The disk performance is comparable to

PC MAGAZINE FACT FILE

FileSafe Combo Series 7000
Mountain Computer Inc.
360 El Pueblo Rd.
Scotts Valley, CA 95066
(408) 438-6650
List Price: $3,195 for 20-megabyte hard disk and 60-megabyte tape unit; $3,995 for 40-megabyte hard disk and 60-megabyte tape unit
In Short: The Mountain Computer FileSafe Combo's strength is its dependability rather than great speed or huge capacity. The Combo's software excels in comprehensiveness and ease of use.
CIRCLE 688 ON READER SERVICE CARD

The Mountain FileSafe Combo Series 7000 (with 20- or 40-megabyte hard drives) relies on familiar rather than innovative technology, but it receives high marks for ease of use, a too-rare occurrence in this product category.

that of standard XT disks.

The tape backup unit uses ¼-inch streaming tape. It utilizes the QIC-24 software protocol, read-after-write error correction, and the QIC-36 hardware interface. An optional "verify" lets you compare tape to disk. The unit relies on standard Scotch DC 600A tapes, and the tapes require no special formatting.

INSTALLATION Installing the unit for use as a single hard drive is a straightforward procedure. Mountain uses a color-coded board and cable hookup; it couldn't have been made any simpler. However, installation as a second hard drive is terrifically aggravating. The cautionary documentation suggests that this procedure may be too difficult to perform without the assistance of Mountain support or an authorized dealer. It isn't exaggerating.

The Mountain ROM version and cable-jumpering specifications are not compatible with some of the makes of hard drive used in our "standard" XTs. The Combo requires a machine whose hard drive cables use removable "nipples" instead of more-permanent pin-nulling systems. Mountain offers to send you a different cable to remedy the situation, but the delay may be intolerable.

Once the hardware is installed, the confused software recognizes all drives at once. It turns out that there is a disk-set switch on the back of the unit. This omission from the documentation is one of the few shortcomings of the otherwise well-executed reference material.

Compared to the installation angst, the thoroughness and helpfulness of the Combo's software is a delight. You can back up a complete disk image or select files for backup by name or date. The system can also back up and restore hidden files and zero-length files. Restoration can occur by search label, the date the backup was made, or by locating the volumes one at a time with a NEXT option. The tape software does not allow background or remotely activated backups, but it does let you examine the contents of the tape and restore files to a different directory.

There is also a handy tagging feature with which you can view the directories and files on the Combo's disk or tape and mark them for backup, restoration, or redirection. The Combo's Multi Volume software accommodates disks with over 32 megabytes of storage, dividing a partition into as many as ten volumes. A SHIP-DISK program locks the drive heads when the disk is not in use.

EXCELLENT PROMPTS Incredibly comprehensive screen prompts enable you to specify whether a backup should be appended to the end of the tape, whether a tape rewind is desirable, and whether to verify or redirect the tape. With the screen prompts, you can monitor the status of an operation, see a visual representation of the percentage of work completed, clock elapsed time, and watch an interactive window for messages.

■ The Mountain unit is a voracious slot hog, requiring two full-length expansion slots.

Mountain's hard disk utility software offers a convenient functional equivalent of DOS, using a menu-driven shell. For real DOS mavens, all of the FileSafe software is available as commands from the DOS prompt.

The system is not without limitations. The disk and tape capacities are modest, the speed of the unit is adequate but not mind-boggling, and the unit is a voracious slot hog, requiring two full-length expansion slots.

Although we didn't test the feature for this review, the Mountain FileSafe Combo is ready for use with the Novell network; one entire document is devoted to using the Mountain system in conjunction with the Novell. It also supports the Orchid and the 3COM Ether series networks.

The Mountain unit fared well in PC Magazine Labs rigorous testing situations with its software as the shining star. The FileSafe Combo Series 7000 makes efficient use of tape storage and is a trustworthy, solid approach to backup and restoration.—**Robin Raskin**

Tecmar QIC-60W20

The Tecmar QIC-60W20 may not be a heavyweight, but its combination of a 20-megabyte hard disk, a 60-megabyte, nine-track tape drive, and respectable software make it an acceptable choice for those with modest storage requirements. While it is compatible with IBM and Novell LANs, its lack of a timed automatic backup limits its practicality for these applications. However, its relatively easy installation and compact design mean that you personally can upgrade your PC or XT. (A separate unit, the QIC-60W20 AT, is available for the AT.)

The QIC-60W20's sleek case is a small 7 by 4 by 14½ inches that can comfortably sit alongside your monitor atop your PC's system case. The unit's front panel includes LEDs for such status information as read, write, and drive selected for both the tape and the Winchester drives, and the track number and direction for the tape. The rear panel has room for two cables, a power cord, and an on/off power switch. Recessed in the bottom of the unit is a switch for selecting the drive number: 1 for C: drive and 2 for any other designation.

The nine-track serpentine tape drive includes a recessed lock mechanism that attaches itself to the tape when inserted. While the manual states that the unit uses DC 300XL tapes, doing so will result in an error message. Tecmar sends DC-600A tapes with the QIC-60. Whether a tape holds one or more volumes is dependent on the setting in the configuration file. If

PC MAGAZINE FACT FILE

Tecmar QIC-60W20
Tecmar Inc.
625 Cochran Rd.
Solon, OH 44139
(216) 349-0600
List Price: $3,495
Requires: 256K RAM in menu mode, 192K in command-line mode; DOS 2.0 or later.
In Short: Tecmar's QIC-60W20 offers a 20-megabyte hard disk, 60-megabyte tape drive, and software (Version 3.321) that you can run either from the command line or through a menu. Not copy-protected.

CIRCLE 626 ON READER SERVICE CARD

the program encounters a new or newly erased tape in the drive, it asks if the backup should be saved to volume 1.

EASY INSTALLATION Installing the unit in a PC is relatively simple. You slip in two adapters, one each for the tape and the hard disk, connect the 2½-inch wide cables, and run IBM's FDISK and FORMAT C:/S commands so that it will boot from the hard disk. Installation on an XT is a little more difficult in that it involves removing the resistor on the bottom of the XT drive (don't worry, it is more than distinctive), replacing the XT's adapter card with Tecmar's, and connecting the drive's cables to it. (The AT-compatible unit requires only one card; Tecmar's hard disk runs off the AT's controller.) While the process is not difficult, it does create a jungle of cables in the IBM unit. Also, you should take care when connecting the cables; if the connectors are not perfectly lined up, the pins, especially those on the bottom of the connector, may bend and create read and write errors later.

Once the unit is connected, you need to run DEBUG to perform a low-level format. This means that you should back up your drive first. After DEBUG, you partition and format your drives. Tecmar claims the hard disk will provide 20 megabytes of formatted storage. After formatting it with DOS's FORMAT command and checking it with CHKDSK, I found 21 megabytes of storage—I always did like getting something for nothing.

Software installation amounts to pressing F1, specifying on which drive and directory to perform the installation, and then inserting the second program disk when asked. The utility resets CONFIG.SYS to buffers=17; I reset it to 20. During backups and restores, the QIC-60 resets the buffers again. On a 640K-byte RAM system, the menu mode uses a 384K buffer, and the command-line mode uses a 512K buffer. On a backup, the speed difference is negligible; on a restore, the command-line mode was faster by a minute.

MENU OPTIONS Menu backup options include a mirror backup, a total file-by-file backup, and a selective file-by-file backup. Through the utilities option you can erase, verify, and retension tapes, and change the configuration file. The directory listing menu allows you to locate any file in any volume and then mark it for restoration. Although the software is both menu- and command-driven, the latter gives you more versatility. Command-line options include backing up by directory, asking for confirmation or automatically overwriting on a restore, appending to the end of the previous volume, producing an error report, and searching through the catalog for a file.

The Tecmar QIC-60W20's compact vertical design makes it attractive to those suffering a shortage of desk space. The second-fastest backup-and-restore benchmark-test results in PC Labs and a reasonable price help balance the irksome necessity of using DEBUG during installation.

When you are selecting individual files for backup, the program displays the files in an alphabetically ordered listing. You can only back up one selection at a time; that selection can be either a file, a group of files, or a subdirectory.

I thought the Tecmar QIC-60 was going to be the only unit I reviewed to back up and restore the PC Magazine Labs SCATTER benchmark test. For 42 minutes it displayed the files it was backing up. When it displayed the last file as saved, it crashed. Graphics characters suddenly appeared on the menu screen and a cold boot was necessary. Because the directory updating was unsuccessful, no volume information was written to the tape. When I attempted to save just one file from the lowest level, the program would save the file to tape but crash while it was updating the directory. Since it did successfully back up a file from the next-to-last directory, I presume the problem stems from an inability to handle the length of the pathname. You must remember, though, that the benchmark test really—and I mean really—created the worst backup scenario possible.

The BIGFILE benchmark tests ran flawlessly, and the backup and restore times were on a par with Emerald's, whose hard disk is decidedly faster. However, even they posed their own questions. For one thing, the software tacked on an additional 384 bytes on the mirror image. The individual I spoke with in Tecmar's tech support group said 384 bytes might be the tape directory listing. He added that his coworkers had noticed varying amounts of bytes being added, but no one really knew

Now, The First Name In Tape Makes Backup Second Nature.

Breakthrough: We store 20 megabytes of backup on this tiny tape cartridge, with legendary Tallgrass simplicity and reliability.

If it can go wrong it will. Probably at the worst possible time. That's The Way Things Work. It's a never-fail Rule of Nature.

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The Tallgrass Corollary for Personal Computer users: Never—not ever—fail to make a backup copy of your important business information.

We've preached backup all along. Now we've done something about it that makes backup more practical than ever.

A fail-safe, shirt pocket solution.

Introducing our new family of micro tape drives. They put more data on a business-card size tape cartridge than 99% of PC users have on their hard disk—20 megabytes.

One model tucks inside your PC. The other sits next to your monitor, in a sleek "zero-footprint" enclosure.

Both employ BackTrack,™ software that automatically copies your hard disk data onto tape throughout the day. So you're never more than a few minutes away from your most current data.

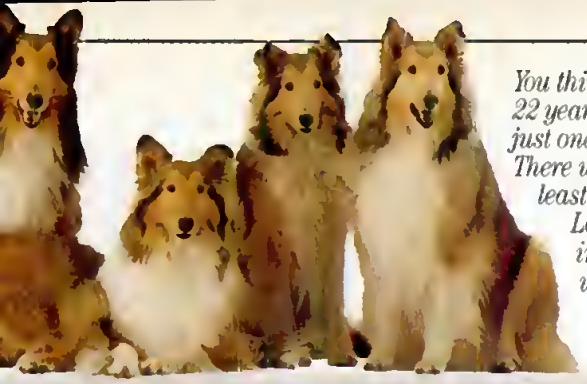
And both are available with a companion 25 megabyte hard disk,

TG-1020i: Half-height internal 20-megabyte tape backup system for PC, XT, AT and compatibles.

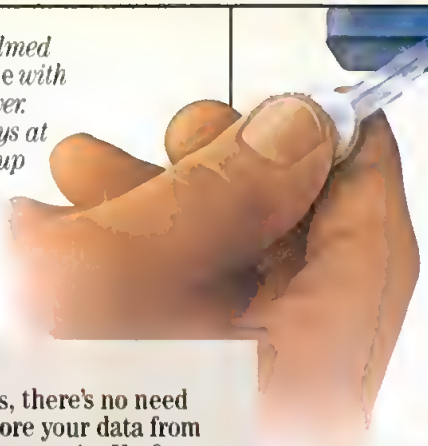
TG-2025i: Internal 20-megabyte tape backup system mated with 25-megabyte hard disk for PC, XT and compatibles. Half-height AT&T/Olivetti model available, too.

How should you feel about tape backup? Take the spare tire out of your trunk for a month and see if that *bothers you.*

December 30, 1978: Danny White comes in as Quarterbackup when Roger Staubach is knocked unconscious, and leads the Dallas Cowboys to a come-from-behind 27-20 playoff victory over the Atlanta Falcons.



You think they filmed 22 years of Lassie *with just one dog? Never. There were always at least two backup Lassies in the wings.*



If you want to reduce the chances that you'll ever get locked out, just go to the trouble of stashing a backup key.

so you can upgrade your PC and get fail-safe tape backup at the same time.

A big step forward in backup. We've pioneered most of the major technological advances in PC tape backup over the past few years. We've set the standard for professional quality, high-end systems.

Now we've packaged that technology to put it within reach of *all* PC users.

That means we made it affordable. And compact. And, most of all, abundantly easy to understand and use.

So if—make that *when*—Fate Deals a Dirty Blow, and operator error, a sudden power surge or the inevitable mechanical failure of a hard disk leaves you dataless, there's no need to panic. Just restore your data from tape. And in minutes you're Up & Running. Instead of Down & Out.

Don't get caught with your backup down.

If you're buying a new system, insist on built-in backup. Before something goes wrong.

If you already have a PC, head back to your dealer and get backup added. Before something goes wrong *again*.

Either way, before you make a move, dial 1/800-228-DISK for the name of the Tallgrass dealer nearest you.

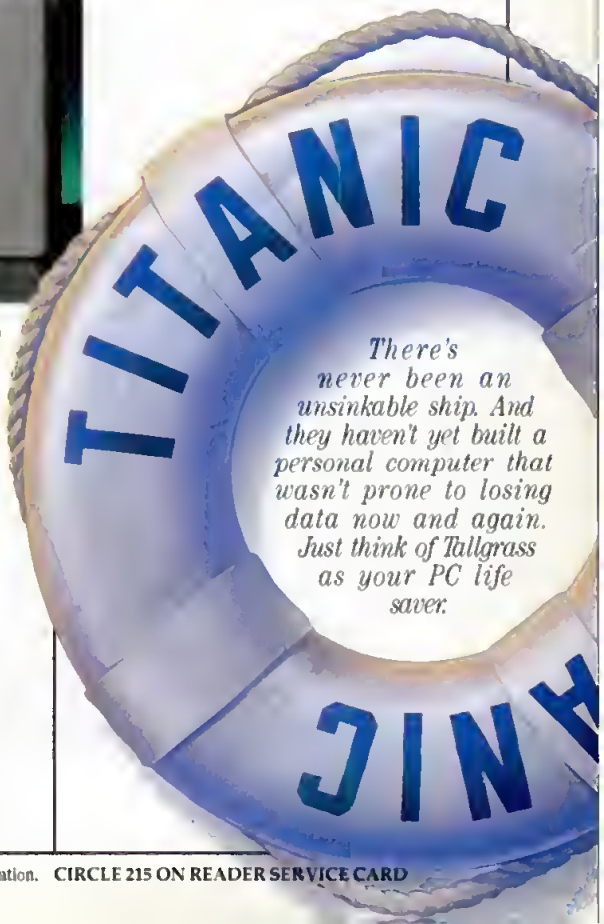
And don't forget to check your spare.

We have a brand new family of micro tape drives, available as internal systems or packaged in a new zero-footprint enclosure.

TG-1020e: Stand-alone 20-megabyte tape backup system for PC, XT, AT and compatibles. TG-2025e includes 25 megabyte hard disk.

TG-4060/5025/6135/6150/6180: 60 megabytes of tape, available as stand-alone backup or with 25, 35, 50 or 80 megabyte hard disks.

BackTrack: Makes backup automatic. And even if you aren't ready for Tallgrass tape, BackTrack software provides streamlined backup from hard disks onto floppies.



There's never been an unsinkable ship. And they haven't yet built a personal computer that wasn't prone to losing data now and again. Just think of Tallgrass as your PC life saver.

TALLGRASS TECHNOLOGIES
When It's Worth Saving.

11100 West 82nd St., Overland Park, KS 66214

BackTrack is a trademark of Tallgrass Technologies Corporation. **CIRCLE 215 ON READER SERVICE CARD**

The SSD-16-T20 excels at providing status information in the form of familiar LEDs on the front panel, but caution advised: Don't judge a hard disk/tape backup system by its cover.

what they were.

The Tecmar QIC-60W20 is a case of the sum of the parts almost equalizing more than the whole. That is, while its hard disk, tape drive, and backup software are no better and no worse than most on the market, the combination of the three make the entire unit more valuable than if you went out and bought separate peripherals.—**Vincent Puglia**

SSD-16-T20

With more than a dozen flashing LEDs, Sunol Systems' SSD-16-T20 will never give you cause to wonder whether it's working. The questions that *will* arise have to do with installation and documentation, capacity, and flexibility.

At first glance, the SSD-16-T20 is impressive. The 20- by 11- by 6½-inch unit contains a 16-megabyte hard disk and a 26-megabyte serpentine tape backup drive. Front-panel LEDs supply status information on power, busy, read, write, error correction, drive, track, head, and five other functions and features. The Sunol software includes programs to diagnose and initialize the drives, run them on a proprietary multiuser network, and perform an image backup and restore. You can even initialize the tape as a logical DOS drive from which you can execute regular DOS commands.

GROWING DISILLUSIONMENT The disillusionment begins when you realize that the standard controller card will not allow the unit to boot from the hard disk unless you purchase optional DMA and boot ROM chips for $50. It gathers momentum when you discover that attaching the SSD-16-T20 to an XT or PC with an internal hard disk provides no additional functionality: the tape backup software works with only the Sunol disk.

While 16 megabytes of hard disk storage may sound reasonable to a small-business user, it apparently doesn't to the people at Sunol Systems; they are planning to replace the SSD-16-T20 with the SSD-21-T20, which will have a 21-megabyte hard disk. According to the Sunol tech-support staff, the only differences between the two models are the price (the new, larger model costs $300 less) and the hard disk storage capacity.

Actually, the way Sunol assigns the file allocation size makes capacity an important issue. The sectors on the hard disk are made up of 8K-byte clusters, double the size used by DOS 2.1 and eight times the size used by DOS 3.1. A 12-byte CONFIG.SYS file will show up as taking 12 bytes when you execute a DIR command but as 8,192 bytes when you use CHKDSK. If you create all of your files in 8K multiples, you maximize the drive's capacity. If you don't, your drive may fill up with less than 10K of data.

AN ILL-FITTING ADAPTER CARD If you install the unit yourself, have Sunol's telephone number nearby. True, the manual is written in English, but it's too technical for the average user. And even an excellent manual wouldn't solve the most basic installation problem: an ill-fitting adapter card. By the time I managed to push the card into the PC's slot, the aluminum bracket had bent out of shape.

Sunol's menu-driven SUNDIAG program partitions, formats, and verifies the hard disk. Compared to the rest of the installation, formatting the hard disk drive is fairly straightforward. You simply set the Format switch. (You'll find it recessed under the Sunol Systems logo, so have a dentist's pick handy.) Then select Format from the SUNDIAG menu and go out to lunch. When you come back, you can verify the format and have dinner.

The fun begins when you attempt to assign your volumes by setting the virtual-drive offset table. This process would be much easier if the software simply asked

PC MAGAZINE FACT FILE

SSD-16-T20
Sunol Systems Corp.
1187 Quarry Lane
Pleasanton, CA 94566
(415) 484-3322
List Price: $3,845
Requires: 64K RAM, Sunol-supplied adapter card, DOS 2.0 or later.
In Short: A thorough status information panel and a capacious hard disk and tape drive can't outweigh the SSD-16-T20's confusing software, sloppy manual, and overall lack of flexibility.

CIRCLE **629** ON READER SERIVCE CARD

Back up 10 megabytes in 8 minutes! (or less)

with Fastback*

If you've ever lost valuable data, you know backing up your hard disk is a *MUST*. For your business, this necessity can become an expensive nightmare. Until now. Fastback (Version 5.0) is the hard disk backup (and restore) software utility that eliminates the need for expensive and time consuming tape backup systems. It's so fast you can back up a full 10-megabyte hard disk on standard 5¼" floppies in less than 8 minutes or 10 megabytes of data on the IBM™ PC-AT in less than 4 minutes! This can mean a 95% savings of time and money.

Fastback is fully self-contained and functions with any make or size hard disk. It works with PC-DOS™, or MS-DOS™ version 2.0 or higher and requires no additional hardware to take up valuable expansion slots in your IBM PC/XT/AT or compatible. FASTBACK USES ADVANCED ***ERROR CORRECTION*** TECHNIQUES TO RECOVER DATA FROM DAMAGED DISKETTES. So if your disk is damaged after the backup procedure, Fastback (Version 5.0) will still be able to recover the data.

Fastback can automatically format your floppy disk as it saves your data; both drives will be used on a dual drive system to eliminate the disk change time. Fastback cataloging feature provides rapid lookup of archived data and prevents accidental overwriting.

You control what files you want because Fastback is completely file oriented, not an image mode backup. All this for the suggested retail price of: *$179.*

With Fastback, backing up is fast and easy. Remember, among those who backup regularly, there are only two types—those who use Fastback and those who will!

For further information, call or write to:

Fifth Generation
SYSTEMS

Sales By CSSL, Inc.: 909 Electric Ave., Suite 308, Seal Beach, CA 90740; Manufacturing: 7942 Picardy Ave., Baton Rouge, LA 70809; Telephone: 1-800-225-2775 or (213) 493-4483; Telex 510/6006 945

CIRCLE 286 ON READER SERVICE CARD

Dealer Inquiries Invited.

Sales by CSSL, Inc.

*This product is in no way associated with or has origination in Fisher Scientific or Allied Corporation. IBM-PC, IBM-XT, IBM-AT and PC-DOS are registered trademarks of International Business Machines Corporation. MS-DOS is a registered trademark of Microsoft, Inc.

you how many megabytes—or even cylinders—you wanted to assign. While the manual shows you how to assign volumes, the information is easily overlooked within the mass of other information.

Before you can use your drive, you must install Sunol's driver in your CONFIG.SYS file and initialize it with a program called SUNINIT. You tell SUNINIT which drive to initialize and how many logical drives you want. If you have made any errors while setting the virtual-drive offset table (and you probably will), you could tell SUNINIT you want 20 or more drives, and it would give them to you. But when you boot up, you'd have unserviceable drive letters.

Whether you are running it from the hard disk or on a floppy drive, the *Sunsafe* tape backup software is the easiest-to-use program included with the unit, mainly because it doesn't allow you many choices. You are asked which volume you want to back up from or restore to and whether you would like to use a table of contents. The software decides everything else—not because of any inherent intelligence but because it essentially performs one type of operation: disk image. As a result, backing up your hard disk will always take 27 minutes, give or take 5 seconds. A half-hour is not especially long to back up a drive; DOS takes just about that long to back up 10 megabytes to floppies.

In addition to the backup and restore features, *Sunsafe*'s other menu choices allow you to perform tape maintenance and operations called backup and restore "by the numbers." The numbers are the starting sector address and the number of sectors. The manual warns that these features "should not be used normally" but doesn't explain what these features really do or why you shouldn't use them.

SIMULATING FILE-BY-FILE BACKUP

The backup software does not support file-by-file backup, but there are ways to simulate this process. While the manufacturer does not recommend it, you can initialize the tape drive as a physical drive and back up your disk by using the DOS COPY and BACKUP commands. Even if you don't use DOS's VERIFY command, it takes approximately 4 minutes to copy one 4K-byte file.

The IDEAdisk and IDEAtape unit, about as sleek-looking as they come, demands patience and hard-earned understanding to install and use, which might be acceptable to some power users if it offered power performance—which it doesn't.

Because of Sunol's 8K-byte cluster file-allocation size implementation, the PC Magazine Labs SCATTER benchmark program wouldn't put all of the files on the disk if anything else was already there. Ultimately, it didn't matter for testing purposes because the SSD-16-T20's disk-image backup and restore consistently takes 27 minutes to complete. This figure doesn't change even if you have only one 2K file on the disk.

The Sunol SSD-16-T20's biggest inherent deficiency is its lack of flexibility. It doesn't allow you to access other drives, and it doesn't normally permit file-by-file backup. Its biggest correctable flaw is its dreadful documentation. If you don't mind owning a piece of equipment that you don't understand, then you might be able to cope with the SSD-16-T20. I'd rather use DOS's COPY command.

—Vincent Puglia

IDEAdisk & IDEAtape

The combined IDEAdisk-IDEAtape system will delight programmers and other masochists who relish not just nuts-and-bolts-level programming but also threading the bolts and tapping the nuts themselves. What must be the most Byzantine installation software in the industry will give them complete control of the most intimate operating parameters of the 40-megabyte IDEAdisk. For data security, a 60-megabyte, ¼-inch cartridge tape backup unit completes the system. You can attach the IDEAdisk-IDEAtape to your PC, XT, or AT and tinker with it to your heart's content and, probably, your wit's end.

On the hardware level, the IDEAdisk-IDEAtape looks much like most other

PC MAGAZINE FACT FILE

IDEAdisk and IDEAtape
IDEAssociates Inc.
35 Dunham Rd.
Billerica, MA 01821
(617) 663-6878
List Price: $3,995
Requires: 128K RAM (256K recommended), DOS 2.0 or later.
In Short: This 40-megabyte medium-performance hard disk with 60-megabyte ¼-inch cartridge-tape backup is particularly suited to the advanced user who wants to control or optimize system parameters.

CIRCLE 625 ON READER SERVICE CARD

—perhaps even
t. hardly more
inch drive slots
for a PC in color
face card (which
bus) easily fits into a
slot, an operation that
re than half of the 5-minute
installation job. Once you con-
e IDEAdisk system to your PC with
ngle cable, you can put your screwdriv-
er away and get into some serious software
frustration.

IDEADISK The IDEAdisk hard disk, manufactured by Rodime, is relatively big but otherwise hardly remarkable. Its heads move over (and under) its eight oxide-coated platter surfaces using a band/stepper actuator to achieve a rather ordinary average access time of 55 milliseconds. The system has no physical park-and-lock feature for its heads, although you can switch on a software "park" capability that keeps the heads from hovering over the file allocation table where they can create a real disaster if they crash. (According to the manual, this feature degrades performance. Although I didn't use it during testing, I saw no damage to the disk after mild abuse.)

The IDEAdisk does not use the standard DOS FDISK or FORMAT commands, substituting its own quasi-menu-oriented system. The formatting procedure is apparently more thorough than the DOS version—it takes substantially longer—and the partitioning functions allow you to carve the 40-megabyte drive into up to 32 DOS volumes. Alas, even after low-level formatting under DOS 3.1, the system clings to space-wasting 8,192-byte allocation units (and, in my tests, displayed a DOS 2.0 identifier in its boot record).

Two software installation programs, DSINIT and FDUTIL, confront you with an ominous and esoteric array of parameters that you can alter to tweak the system to peak performance, from sector interleave to head precompensation. The menu control should make changes easy, but even in my second run-through I kept bumping into brick walls. Even when following the instruction manual to the letter, I was never quite able to get the system's boot-from-hard-disk feature working properly. Some incomprehensible error messages, which flashed so briefly they were nearly invisible, were no help at all. No inexperienced user would want to tangle with the intricacies of this software. Once installed, however, the IDEAdisk hard disk functions quite smoothly.

IDEATAPE The backup software that controls the IDEAtape (a Wangtek half-height cartridge tape transport) combines two separate programs, one menu-driven (with on-line help) and one command-oriented. Both image and file-by-file backups and restorations are available, but, compared with the recent spate of really quick programs, they are laggardly indeed. The tape never really streams; rather, the system seems to pause for breath for several long seconds after inhaling each block of data.

■ The IDEAdisk-IDEAtape combo does not quite reach the level of plug-and-play.

Although the menu-driven side of the IDEAtape software is probably within the ken of even inexperienced operators, I found it a more severe taskmaster than I would have liked. For instance, it makes you remember tape and backup session names (which, however, would undoubtedly prove helpful in organizing the backup system for a small business). After a couple of jousts with the menu structure, I came to prefer the command-oriented backup procedure, which combines the features and abilities of DOS's BACKUP and RESTORE utilities with a similar (but not identical) syntax.

Attempting a file-by-file backup with the disk environment of the SCATTER benchmark test resulted in an arabesque of obscure error messages, culminating in "Divide Overflow." The IDEAtape did, however, carry off the image backups and the file-by-file handling of the BIGFILE environment flawlessly, albeit slowly. Restoring those image backups is an all-or-nothing affair (individual files cannot be restored from an image) that requires a target environment essentially identical to that which was backed up.

The IDEAdisk system documentation has a professional, thoroughly polished look that hides some of its important omissions, such as the details involved in resetting port addresses. (The IDEA choices conflicted with those of my Tecmar Graphics Master, and for expediency's sake I ended up shoving a different color board in to bring the system to life.)

Despite the good intentions of its maker, the IDEAdisk-IDEAtape combo does not quite reach the level of plug-and-play. This system is best reserved for the advanced user. Unfortunately, it lacks the performance that today's power user demands.—**Winn L. Rosch**

Qicstor 36

Long before the current deluge of backup units flooded the PC market, Alloy Computer Products was making solid, reliable systems. The Qicstor 36 represents the company's current line with 29 megabytes of hard disk and 60 megabytes of file-by-file, ¼-inch cartridge tape backup. Like its forebears, it's sturdy enough for a tough office environment and offers guaranteed tape interchangeability. Unfortunately, today's competition beats it soundly on speed and features.

Using the same full-length (14-inch) expansion card and a single fat cable, the Qicstor system will connect with a PC, XT, AT, or any one of a large number of compatible computers. Of course, the 8-bit bus of the interface card effectively limits full 16-bit computers like the AT to half speed. The Alloy hard disk driver software does compensate somewhat for different host computers by automatically optimizing the sector interleave.

The Qicstor chassis itself is slightly larger than a PC or XT and is painted and styled similarly, designed for mounting directly beneath its host. In addition to the tape transport and power supply, one Microtek (a division of Tandon Corp.) hard disk was installed in the test unit, leaving enough empty space for you to add a second full-height hard disk in the future.

INTEGRATION The integration of the hard disk into the Qicstor 36 system is unusual in several ways. The Qicstor disk is compatible with neither the DOS FDISK nor the FORMAT programs. The system will boot from the hard disk, but not in the manner most drives do—that is, by merely adding the necessary operating system to the first hard-disk partition. Instead, the Qicstor reserves a separate area of the hard disk that it devotes to a "virtual floppy disk," which the host computer recognizes as disk A: and uses for booting. A special program allows you to switch this virtual floppy off and on after booting so that a conventional floppy drive can also be assigned as drive A:.

Other differences in hard disk integration of the Qicstor became apparent when the Core International DISKP benchmark program would not run, which hinted at some very low-level incompatibility with the IBM standard. A probe with DOS's DEBUG, however, revealed normal disk structure and sector arrangements. Thus, while most software should work happily with the Qicstor, there is a possibility that some badly behaved software (programs that take direct hardware control of the hard disk) will be incompatible with it. Any such problems are likely to be limited to utility programs and won't be found in today's commercial software that's designed to be tolerant of so-called "IBM-compatible" computers and peripherals.

The Qicstor 36 backup system is built around the near-standard 3M ¼-inch cartridge using a Northern Telecom tape transport. Nine tracks of serpentine recording give a maximum of 60 megabytes capacity per DC600A cartridge.

Speed isn't everything, and Alloy's Qicstor 36 is the best evidence of this heresy. Downright poky in some instances, the Qicstor wins points for the interchangeability of its media.

Backup and restoration are handled only file-by-file. Alloy's goal apparently is to make tapes as interchangeable as possible between systems rather than aim for speed above all. When backing up, the Qicstor instilled great confidence as it flawlessly sorted through the myriad directories created by the SCATTER benchmark test. When I restored the files on a blank disk, the exact subdirectory hierarchy was perfectly re-created without a hitch.

Note that little of the 2½ hours required to restore the complex subdirectory structure was because of the start-stop nature of the Qicstor's file-by-file operation—restoring a single 10-megabyte file, which needs no directory manipulation, took only 7½ minutes.

The backup and restore software consists of a single program that uses both menus and commands. You choose individual functions (initialize tape, backup, restore, directory, and so on) by menu but select options to those functions by command. Files can be automatically included or excluded from a backup session by listing them in special script files. Alloy claims to include a program to make backups automatically at appointed times, but this program did not come with the review unit. Note that although the Qicstor software does allow you to restore a file to a different directory (or even with a different name) than its original, only one such file can be restored/changed at a time.

DOCUMENTATION The documentation that accompanied the Qicstor was reasonably straightforward and should allow even inexperienced users to get the system running in an hour or less. But the manual did not mention that the only version of the backup software that would work with the test unit was buried in a subdirectory on the distribution disk, a hide-and-seek game that caused much head-scratching and delays in testing.

In today's marketplace—filled as it is with innumerable carbon-copy products—the Alloy would seem idiosyncratic with its unusual approach to its hard disk. Nevertheless, it is a very usable system and one that seems destined to be very reliable. The Alloy approach to backing up—with the emphasis on interchangeability of the media rather than speed—makes the system a top choice for ferrying large amounts of data between systems, even cities, on convenient tape cartridges.—**Winn L. Rosch**

PC MAGAZINE FACT FILE

Qicstor 36
Alloy Computer Products Inc.
100 Pennsylvania Ave.
Framingham, MA 01701
(617) 875-6100
List Price: $4,595
Requires: 256K RAM, DOS 2.0 or later.
In Short: Twenty-nine megabytes of hard disk combined with 60 megabytes of file-by-file (only) tape backup. Although it backs up more slowly than many systems, the Qicstor 36's tapes are fully interchangeable and the system can handle the most elaborate directory structures.

CIRCLE 685 ON READER SERVICE CARD

For thousands of years, man used personal computers without decent tape backup. Enough.

Personal computers have come a long way. Unfortunately, tape backup systems have not. Their functions are primitive, they're frightening to install and truculent to use.

Genoa's Galaxy™ Systems are more highly evolved. So not only do they outperform competitive systems, but using them is actually something that can be done by an ordinary human.

The simpler. The better.

Our software is what makes the difference between our systems and everybody else's. And it's designed to help you use the system easily in either of two modes. Namely, menu-driven or batch file.

The menu mode operates true to its name, with menus showing all the commands you have to choose from. And there isn't a thing you can't do from the menu mode because it's comprehensive.

You'll want to use the batch mode for routine operations though, because it allows you to create a "file" to contain those operations and run them automatically, just by hitting a few keys.

But probably the best example of just how downright civil the Galaxy systems can be is our auto backup. You just preset the time and the desired function, and the system does the rest. Automatically.

No other tape backup systems, by the way, operate this simply.

The features all tape backups should have. But don't.

Before you make your first backup—which is the right time to do this—our installation software checks your disk configuration to make sure your tape drive will run at top speed. And it checks the entire system to guarantee it will perform as promised. No competitive system offers anything like it.

Another thing you can do is abort any command at any time. So you don't have to sit through a 20-minute file-by-file restore just because you hit the wrong key.

You can also do a file-by-file restore from an image backup. So you can get back the one file you need rather than all the files you don't.

But whether it's a couple of files or a complete image, you'll be pleased to know you can restore to any storage device, thanks to Galaxy's interchangeability feature.

Multiple backups on the same tape—even from multiple sources like a floppy or another hard disk—aren't a problem either. The system simply starts recording where the last backup ended.

Or you can use multiple tapes to back up very large files. The system will just let you know when it needs a new tape.

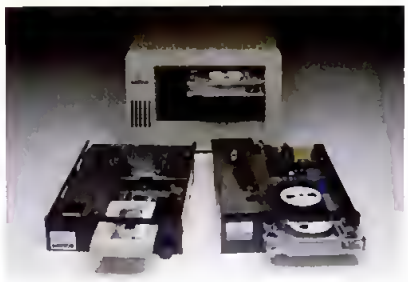
We also perform crc error checking constantly. We can back up a 20 Mb disk in just over 4 minutes. And we're network compatible.

What price progress?

Surprisingly, the Galaxies cost somewhat less than tape backup systems that offer less. Which includes all of them.

For the Genoa Galaxy dealer near you or complete specs, call 408-945-9720. Or write Genoa Systems Corporation, 73 E. Trimble Road, San Jose, CA 95131.

The Genoa Galaxy Systems. The most civilized tape backup in history.



The IBM®-compatible Genoa Galaxies are available as internal or external versions of ¼" streaming tape or cassette models. (External cassette not shown.)

Genoa
We make PCs better.

Galaxy is a trademark of Genoa Systems Corp © 1986 Genoa Systems Corporation

CIRCLE 239 ON READER SERVICE CARD

TG-6135

Tallgrass Technologies' TG-6135 combines a 60-megabyte tape drive with a 35-megabyte hard disk to deliver reliable backup and restore operations at a reasonable price. You can perform both image and file-by-file backups, partition your tapes and drives into volumes, create a drive volume of over 32 megabytes, and even recover data from a tape that has a damaged directory. In the process of delivering these capabilities, though, Tallgrass has designed certain TG-6135 features in a way that undermines the unit's utility.

The TG-6135 combines an easily installable DOS-compatible 35-megabyte hard disk and a 60-megabyte tape drive. The software included with the review unit was perilously flexible, though supplemental programs minimize the problems.

PARTITIONING THE DISK The TG-6135 hard disk drive, which sits between the power supply and the tape drive, defaults to two equal-size volumes of 17.5 megabytes each. Once you have connected the cables and run a test program to check them, you partition the disk with PDISK, Tallgrass's proprietary FDISK-type program. If your system comes up with the default settings, you should have no problems. You simply create DOS partitions, exit, format the drives, and begin using your system.

If you like, you can reset the defaults and specify up to 16 volumes by moving a jumper located on the top of the hard disk. The only difficulty is that occasionally the TG-6135 stubbornly holds onto whatever configuration it is in at the moment. Either it will not reconfigure the number of volumes, or it will not boot from the internal hard disk. Neither problem is insurmountable, but a call to Tallgrass tech support is necessary since the manual is not very helpful. The Tallgrass support person told me to run Tallgrass's DTEST program to write over the first dozen or so cylinders immediately after resetting the jumper.

After a format, the drive showed 67,584 bytes in bad sectors. Some 67K bytes of bad sectors on a new 35-megabyte drive is like a new Cadillac with scratches under the hood; it's not the end of the world, but it is disheartening. Tallgrass should consider remapping the disk so that bad sectors never appear on a CHKDSK and you and DOS see only a clean surface.

The tape drive accommodates both 15- and 60-megabyte tapes. You simply slide the tape into the opening until you hear a click. Removing it requires an initial tug. A door, latch, or button would be nice. Preparing a tape takes almost 2 hours. If you estimate four tapes per drive for your first backup—two each of image and file-by-file—you are looking at a full day's work. True, you do not babysit for the entire length of time, but your PC does. If Tallgrass cannot trim the formatting time, it should provide preformatted tapes, background formatting, or the money to hire a temporary worker to do the formatting after working hours.

Once formatted, tapes need to be partitioned into volumes. The software allows only two choices: one or five volumes. Note: although a 60-megabyte tape should be able to have five partitions of 12 megabytes each, the manual says 10-megabyte volumes are created. Okay, I'll allow 2 megabytes of overhead for sloppy programming—but if a volume is 10 megabytes in size, why couldn't it store the PC Magazine Labs BIGFILE benchmark test? It only occupies 10 million bytes. If the answer resides in the PC/T format, then the manual should mention how much of the tape's capacity is actually available for backup and how much for backup redundancy.

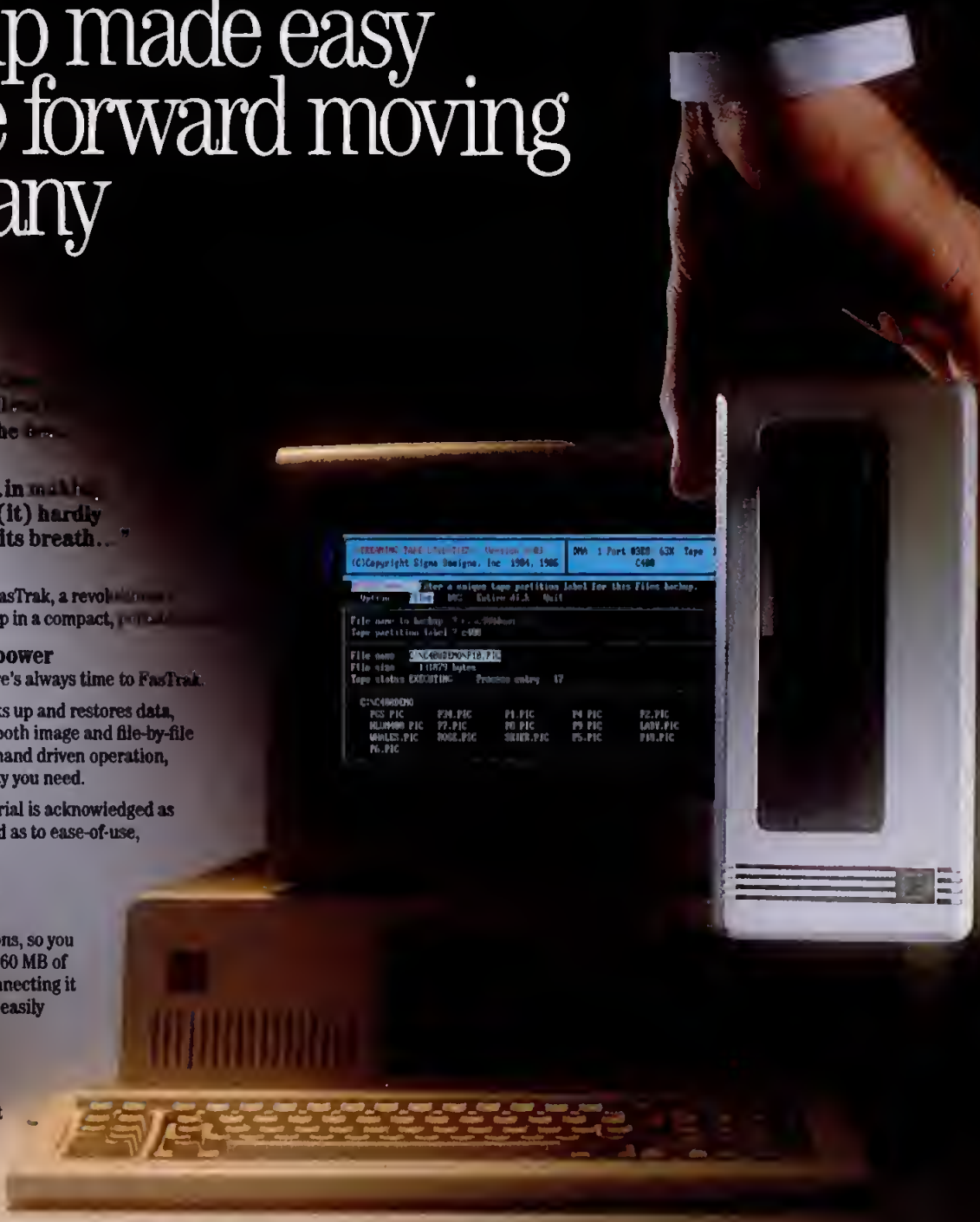
TEX SOFTWARE The *TEX* backup software (Version 1.3) offers a command-line interface. Some of its 18 commands, such as TYPE, PRINT, and PATH are unusual for tape backup software. You don't need to learn all of the commands since you can include them in batch files. However, that implies you need someone who can write batch files. And don't expect much help from the program itself. *TEX*'s on-screen help is limited to a list of commands, their optional switches, and a chart showing their drive-type compatibility. On the whole, though, *TEX* is powerful enough for you to forgive its faults.

PC MAGAZINE FACT FILE

TG-6135
Tallgrass Technologies Corp.
11100 W. 82 St.
Overland Park, KS 66214
(913) 492-6002
List Price: $4,660
Requires: 256K RAM, DOS 2.0 or later.
In Short: Tallgrass Technologies' TG-6135, which is compatible with the PC, XT, and AT, comes with a 60-Mbyte tape drive system, a 35-Mbyte hard disk drive, and command line–driven backup software (Version 1.3). Not copy-protected.

CIRCLE 628 ON READER SERVICE CARD

FasTrak™: Backup made easy for the forward moving company



"Performance is exce… it has speed and excell… diagnostics…one of the …"
PC Tech Journal

"A smooth operator…in … file-by-file backups…(it) hardly ever stopped to catch its breath…"
PC Magazine

Sigma Designs introduces FasTrak, a revol… concept: powerful PC backup in a compact, …

FasTrak delivers the power

Speed. At 5 MB/minute there's always time to FasTrak.

Performance. FasTrak backs up and restores data, reliably, consistently. With both image and file-by-file modes, and menu and command driven operation, FasTrak has all the flexibility you need.

Simplicity. Our on-line tutorial is acknowledged as the best in the business. And as to ease-of-use, ask any dealer!

Big things do come in small packages

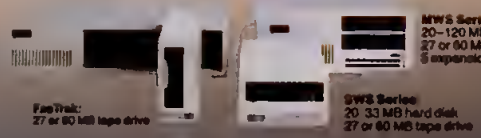
FasTrak comes in two versions, so you can backup either 27 MB or 60 MB of … per tape. And since connecting it … so simple, FasTrak moves easily … PC to PC, or XT or AT.

… all in the family

… carries on Sigma Designs' tradition of product …cellence. For backup, storage, expansion, or all three, Sigma Designs the systems.

FasTrak. To keep *you* moving forward.

Call (408) 943-9480 for the Sigma Designs dealer nearest you.



SIGMA DESIGNS

SIGMA DESIGNS, INC. 2023 O'Toole Avenue, San Jose, CA 95131, telex 171240

CIRCLE 252 ON READER SERVICE CARD

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Backs up to and restores from Bernoulli Box	YES
Backs up to/from removable cartridges	YES
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Macintosh version available	YES
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CIRCLE 510 ON READER SERVICE CARD

AN IMPRESSIVE ALTERNATIVE TO HARD DISK BACKUP

The Video Memory Manager stands out as a cost-effective means of making hard disk backups, especially at home.

If you own a VCR and do a lot of work at home, backing up your hard disk onto videocassettes may be a convenient and economical alternative. A new offering from Kirsch Technologies, the Video Memory Manager board, makes it all possible. The combined hardware and software package allows you to back up data from the computer's hard disk drive to inexpensive and easily obtained videocassettes in either VHS or Beta formats. More than 150 megabytes of information can be stored on a single videocassette, which, at an average cost of $5 per cassette, results in a media cost of only 3 cents per megabyte—cheap compared with other backup media.

INSTALLATION The Kirsch VMM officially takes up only one expansion slot, but, because the card is so wide, the adjacent slot must also be vacant. Otherwise, you install it the same way you would any accessory card. It consumes less than 6 watts of power. It works with the IBM PC, XT, or AT, and true compatibles. All necessary interconnecting cables, which are the same kind used for any VCR connection, are supplied, and you can, if you like, extend the cables to up to 60 feet from computer to VCR. The software comes on a single 5¼-inch disk and has easy-to-use DOS-like commands. The command structure, or T commands, allows the use of standard DOS filename formats and supports global filename characters; all commands can be executed from batch files to permit unattended operation.

SETUP The VMM comes in two models. To use the first one, the VMM, you have to manually switch or control the VCR. The second, VMM ATP, has a cable assembly terminating in a five-pin DIN connector that permits owners of VCRs with corresponding remote connectors to control the VCR from the computer's keyboard and to find a specific file on the tape by entering the tape position counter number. You connect the VMM card and the VCR by simply plugging in the RCA phono plug–terminated cables from the controller's Video Out to the VCR and from the VCR's Video Out to the controller. A third RCA phono jack on the controller permits Video Out to a monitor. You use the optional remote cable only if you have the VMM ATP and a VCR with remote capabilities. The very well-written manual covers software and hardware installation, as well as cabling, in extreme detail.

■ Making a backup is as simple as entering the right command and making sure your VCR is on.

The VMM software for both models is menu-driven. The TBACKUP utility does an image backup, which you can do automatically with a batch file. The TSAVE utility does file-by-file backups in the background. It lets you choose individual files, subdirectories, only modified files, or only files created after a certain date. As the VMM makes a TSAVE backup, it generates a series of messages that by menu selection can be automatically sent to your printer, written to a file, ignored, sent to COM1:/AUX, or appear on-screen.

In essence, making a backup is as simple as entering the right T command and making sure that your VCR is on and has a tape in place.

The VMM generates and places viewable file headers and title lines next to data files on the tape. With the ATP model and a remote-control VCR, you can specify a file location on the tape and have the recorder go directly to that file without having to run the entire restore procedure. The VMM can also function as a high-speed (400 kilobytes per minute) data-transfer device linking two VCRs and permitting data transfers via interplant/office coaxial cabling or satellite transmissions. It also permits transferring data from one location to another by physically sending the videotape and playing it back using the TRESTORE utility in the new "host" computer.

Kirsch Technologies' VMM offers a viable and easy-to-use alternative to more-conventional means of hard disk backup. The videocassettes it needs are readily available and with 150 megabytes of storage, even mammoth hard disk users won't run out of space too soon.

—Elliott S. Kanter

Elliott S. Kanter is a free-lance writer specializing in electronics and computer technology. He has written two books on biomedical engineering.

PC MAGAZINE FACT FILE

Video Memory Manager
Kirsch Technologies Inc.
201 N. Riverside Ave., Bldg. A-5
St. Clair, MI 48079-0120
(313) 329-7166
List Price: VMM, $695; VMM ATP (auto tape positioning), $895
Requires: One floppy disk drive, VCR.
In Short: An easy-to-use, unique, and cost-effective—though somewhat unconventional—method for making backups of hard disk data using a VCR and tape as the storage medium.

CIRCLE 824 ON READER SERVICE CARD

If only the opposite were true. While *TEX* catches syntax errors, it does not check for the human faux pas. For example, it can restore a 10-megabyte image onto a larger target, but it doesn't tell you it is wiping out any files that occupy the target area. Nor does it tell you it is overwriting a file that's already on tape during a backup. When restoring files, *TEX* does not differentiate between image and nonimage backups. So, if you enter RESTORE O: D:, all of the files on tape volume 0: will find their way to disk volume D:. If the first file on tape is the image file, some of the file-by-file backups may not be restored because of lack of room. I shudder to think what happens when the image backup is the last file on the volume.

The TG-6135 had no problems with the BIGFILE benchmark test when the tape was formatted as one volume. It backed up and restored it, in both image and file-by-file modes. SCATTER created a problem with a file-by-file backup. The backup would proceed for a few minutes and then crash. When I renamed the topmost two levels so that they were only two characters in length each, the backup proceeded and crashed only because the volume was filled. Since timing an adjusted benchmark test would have invalidated the results for other units, I did not rerun the benchmark test.

My biggest complaint with the TG-6135 unit is that it interferes with everyday processing. At one point, I disconnected the cable, shut down the unit, and started writing this review with *WordStar* on my drive C:. In the middle of a block move, the controller card's ROM began writing a "TG821" message across my screen. I don't like programs that interfere with other programs.

A final suggestion: if I had a TG-6135 unit, I would go out and get Tallgrass's *BackTrack*, a device-to-device menu-driven backup program that offers background processing and handles human errors much better than *TEX* does.

At press time a Tallgrass spokeswoman informed me that each combination hard disk/tape drive unit will be shipped with new software. In addition to an updated version of *TEX*, Tallgrass units will include *BackTrack*, *Xtree* (an extended DOS services program), *Image* (a fast-streaming image-backup program), and *Alarm Clock* (a utility that will allow you to specify the time of an automatic backup). Now that's what I call power of the press!

—Vincent Puglia

The Emerald 72DOS-4001 is the easy winner for Editor's Choice if cost is no object. Its 60-megabyte serpentine tape drive and 72-megabyte hard disk are ideal for LAN applications. For those to whom speed is everything, Emerald outpaces the competition in most categories.

Emerald 72DOS-4001

If diamonds are a girl's best friend, Emerald's 4000 Series should be your PC's. This unit is a real jewel. The Emerald 72DOS-4001, which comes with a 72-megabyte hard disk and a 60-megabyte serpentine tape drive, also includes four free 8-bit slots in its chassis for added expansion. The 19½- by 15¼- by 6-inch unit may be huge, but that just means there is more there to love, not the least of which is its ASP backup software. Whether you're looking for speed, reliability, capacity, or effortless operation, you'll find it in an Emerald.

Any Emerald Series 4000 unit can come with a 30-, 40-, 55-, 72-, or 118-megabyte hard disk and be compatible with PCs, XTs, and ATs. The XT and AT configurations include additional cables. If you're worrying about the standard 32-megabyte DOS barrier, don't. Emerald was the first to break it. The implementation is so transparent that neither you nor DOS ever realizes it's working with something it shouldn't.

INSTALLATION Installing the hardware on a PC entails nothing more than slipping in the adapter card and connecting the cable. Installation on an XT is more involved because you must disconnect the XT's standard cables and then connect the set supplied by Emerald. But even so, this is standard procedure for many similar units.

You can partition the 72 megabytes into as many volumes as you like with little effort. All you need to do is decide how many cylinders to devote per volume. Although a prompt for megabytes would be easier, you can adjust the number of cylin-

PC MAGAZINE FACT FILE

Emerald 72DOS-4001
Emerald Systems Corp.
4757 Moreno Blvd.
San Diego, CA 92117
(619) 270-1994
List Price: $6,995
Requires: 256K RAM, IBM PC, AT, or XT, DOS 2.0 or later.
In Short: The Emerald 4000 Series offers a 60-megabyte tape drive subsystem, a range of hard disk capacities from 30 to 118 megabytes with better-than-AT speed, expansion slots, and easy-to-use software.

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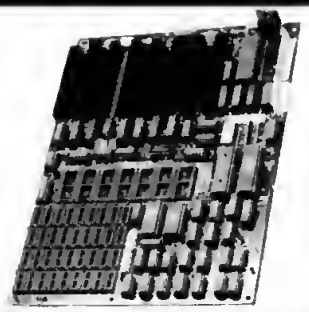

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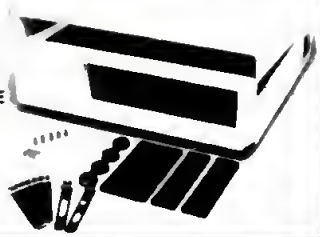

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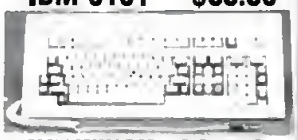

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ders until you achieve the result you want.

Connecting the 72DOS-4001 to a system with another hard disk, such as the XT, requires that the non-Emerald disk have an Emerald image. Prior to performing the installation, you disconnect the Emerald's hard disk controller, connect the cable to the tape drive and the XT, and then back up your XT's hard disk to the Emerald tape. Then you run the installation program, which will reset the interleave factor to 2, reformat the drive, and map out any bad sectors your disk may have. After that, you install the Emerald drive and restore your XT's files. If you ever decide to disconnect the Emerald, you must then reformat the XT's hard disk with IBM's Advanced Diagnostics disk.

While reformatting the XT's hard disk is not a desirable option for people such as hardware evaluators, who need to have pure IBM systems, it does not pose a problem to the average user. In fact, the Emerald image enhances the system; you can meld the XT's disk with the Emerald drive to create an 82-megabyte drive.

TAPE BACKUP In the PC Magazine Labs test, the Emerald's hard disk showed itself to be one of the fastest drives available. In one test, it actually exceeded all IBM specifications by more than 30 percent for the PC AT. The tape drive was equally fast: it could back up the entire 72 megabytes onto two tapes in under 20 minutes.

ASP is the most flexible tape backup software I've seen. It does not require you to format a tape prior to use. And you can back up by drive, volume, date and time, all files (active clusters), and individual files and directories—which amounts to all the control you will ever need.

When backing up in any of the file-by-file modes, the screen displays information such as the number of files and bytes being backed up, the elapsed time, and the buffer size. During the backup, Emerald resets as much memory as your system can spare for buffers; on a 640K system that comes to over 504K. Many of the other units tested reset the buffers but fail to tell you so. Emerald is considerate enough to inform you. ASP also displays the files in directory-listing fashion along with the attribute and status, such as directory, and whether it is backed up or not. A light bar at the bottom of the screen shows the current progress.

The drive and volume backups are image backups. Screen information includes the light bar, the drive number, the status of the cylinders and heads for the start, the current progress, and the end. The Drive selection backs up the entire 72-megabyte drive. The volume backup operates only the portion that contains the volume you designate. Because the Emerald drive is larger than the 60-megabyte tape capacity,

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you will need two tapes to complete the operation. When ASP has filled one tape, it instructs you to insert the second one.

During normal usage, you will probably perform a drive or volume backup on a schedule and one of the file-by-file operations sometime during the week. The Emerald 72DOS-4001 doesn't have an Archive-bit backup, but you don't need it. Backing up a directory or even the entire volume by using the All Files selection is fast enough. For example, backing up the PC Magazine Labs BIGFILE took a little more than 3 minutes, and that includes the 1 minute overhead for rewinding the tape. At speeds like that, it doesn't pay to search all the directories for the one or more that have been modified. If your network setup prohibits backing up during normal working hours or you cannot spare the 6 minutes to perform a volume backup, you can set up a batch file to perform the backup automatically at a time you designate.

DATA RESTORATION The procedure for restoring data is just as flexible and reliable. ASP uses two error-correction techniques when backing up and restoring data: read-after-write and QIC-24. You can specify any destination for any data backed up by ASP as long as the restoration criteria are the same. That is, file-by-file backups can be directed to any drive, volume, or subdirectory in any order you wish. When restoring data from a disk-image mode, you must restore it to a device of equal size. You cannot restore a single file from the image, and you cannot restore a disk image onto a volume unless they are equal in size. While this may seem to be a limitation, remember that an image is an exact duplicate. A program that allows you to restore an image to a different environment is not restoring an exact image. Moreover, the file-by-file backups are so fast, you don't need to restore individual files from a disk-image backup.

Complaints? I have a few—very few. The connecting cable could be somewhat longer. Some people might place the subsystem on top of the PC, but that arrangement is virtually impossible for those of us who are constantly pulling boards in and out of the system or have the PC on a shelf or on the floor under the desk. I also am not pleased with Emerald's version number designations. Rather than using the normal "1.0" through "5.03" version designation, the company used coded letters. Of course, it makes no difference what the version is, but I feel more comfortable working with a program that has a number I recognize.

The Emerald 72DOS-4001 capacity may be overkill for the average home user, but for the corporate world or the power user, it offers power and flexibility not seen with most other systems. This unit is worth your money and time.

—Vincent Puglia

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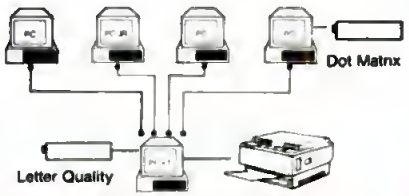

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In England, Tashkl Computer Ltd 01-904-4467

CIRCLE 520 ON READER SERVICE CARD

AST-4000

The AST-4000 is in many ways like the starship *Enterprise* in "Star Trek." Just as that vision of future interstellar travel was built with archaic 1960's technology, the AST-4000 blazes into new territory using the up-and-coming SCSI interface burdened with rickety, out-of-date software. Even so, the 74-megabyte, expandable system is polished enough to give users reasonably secure massive disk storage to keep their networks running.

The heart of the AST-4000 is a 74-megabyte hard disk drive by Fujitsu. It's commendably fast—turning in a 29-millisecond average access time in the PC Magazine Labs speed tests—and holds even greater speed potential because of its SCSI interface, which breaks through the 5-MHz data-transfer rate barrier imposed by the PC's hard-disk interface.

AST Research deals with the AST-4000's capacity in excess of the 32-megabyte DOS limit by partitioning the drive. In default configuration, three virtual drives are available, each with 25,362,432 bytes of actual capacity. Only the first partition, drive C:, is compatible with the DOS format program. Managing the rest of the partitions requires use of AST's proprietary, menu-driven software. The hard disk proved compatible with all of PC Labs' test software and can boot its host computer.

Alas, the hard disk side of the AST system was disappointing because little was done with it to squeeze all the speed or features possible out of the SCSI interface. For instance, the same full-length interface expansion board is used in the PC, XT, or AT, effectively handicapping the last in that list to half-speed operation because of its 8-bit bus.

SCSI also adds a novel compatibility to the AST-4000. The identical hard disk/tape backup unit used for PCs is also plug-compatible with the Macintosh Plus computer. (Alas, the disk must be reformatted to use with the Mac. Data files are not interchangeable.)

The tape drive in the AST-4000 is the ubiquitous Wangtek, which uses nine-track serpentine recording on standard 3M Company–designed DC300XL and DC-600A ¼-inch tape cartridges.

The AST-4000, with its huge disk capacity, continues AST Research's reputation for good design and workmanship. Innovative use of the SCSI interface, however, is compromised by less-than-innovative software—a correctable problem.

ODD UTILITY SOFTWARE Accompanying the system is an odd bag of utility software. Both image and file-by-file backup abilities are available. However, the image system is menu-driven and attempts to mimic the horizontal-bar selection system used by *1-2-3*, while the file-by-file software is command-driven.

The image system seems to date from the Dark Ages of backing up. It pumps every cluster of the disk, whether or not in actual use, to the tape and wastes time backing up blank disk space. The images can only be restored to partitions of equal or greater size than the original (you'll have to do some disk rearranging if some clusters go bad between backing up and restoring). Image restoration is an all-or-nothing affair—individual files are not accessible. The restoration software even restored files to simulated bad sectors.

File-by-file backup is a start-stop affair. The tape drive seems to lay a single cluster on tape, then checks its place before writing the next. Again, a good deal of time is wasted. The software does allow many options for choosing files to back up but does not allow individual files to be excluded from the session.

The file-by-file software cannot handle files with combined drive/directory/filenames more than 63 characters long. Thus, it inauspiciously crashed when attempting to back up a disk with an elaborate subdirectory structure created by the PC Labs SCATTER benchmark test. Not one file made it to tape in the process. Hence, a single lengthy pathname might prevent the system from working at all in file-by-file mode.

The system cannot make automatic backups. Moreover, all backup and restoration is done in the foreground, a particular disappointment because the SCSI inter-

PC MAGAZINE FACT FILE

AST-4000
AST Research Inc.
2121 Alton Ave.
Irvine, CA 92714
(714) 863-1333
List Price: $7,499
Requires: 256K RAM, DOS 2.0 or later.
In Short: A combination of 74 megabytes of hard disk and 60 megabytes of image and file-by-file tape backup. This is a sturdy, fast system limited by an older software design.

CIRCLE 686 ON READER SERVICE CARD

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KEEPTRACK PLUS offers more than speed in backup/restore. It also provides the *flexibility* to fill every user's different needs.

Because each PC setup is unique, KEEPTRACK PLUS gives you hard disk backup without limitations: You can back up to diskettes, another hard disk, or even a Bernoulli box. It is set up for batch- or menu-driven operations. You can perform full, partial or selective file backups.

Exclusive to KEEPTRACK PLUS are "working backups" that let you work *directly* from your backup disks. Our backup disks are not specially encoded and may be read directly by DOS.

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. . . PLUS BEST FILE MANAGEMENT SYSTEM AROUND
In addition to superior backup/restore capabilities, KEEPTRACK PLUS includes the best file manager available — *at no extra charge!*

It performs all DOS functions and more — including rename directory, move files and branch operations. KEEPTRACK PLUS delivers a simple yet thorough way to get your hard disk under control, based on a visual chart of your disk. In fact, it offers "the most sophisticated screen graphics" around, says *PC Products*.

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KEEPTRACK PLUS offers:

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- "Working backups" so you may be able to work directly from backup disks
- "Browse-and-mark" with arrow keys for easy file selection
- Extensive file management tools (sort, copy, erase, etc.)
- Speedy backup
- Backs up to any DOS device (second hard disk, Bernoulli box, etc.)
- No copy protection
- Low price

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CIRCLE 392 ON READER SERVICE CARD

Requirements: IBM®PC, XT or AT and other compatibles, with 256K under DOS 2.0 or higher. Works with hard disks up to 80MB

24-HOUR TOLL-FREE ORDERING: (800) 628-2828 x700

TWO NEW HIGH HURDLES FOR BACKUP SYSTEMS

To test the combination hard disk/tape backup units, PC Magazine Labs devised two new benchmark tests, one using a single, mammoth file, the other filling up the disk with 1,578 subdirectories.

Backing up is a complex process with many options. The usefulness of any system depends not just on the hardware and software used for backing up but also on the material put away for safekeeping. Everyone's hard disk is different, covered with files of various sizes, arranged in its own, probably unique, subdirectory system.

After consulting with the tape backup industry, PC Magazine Labs created two new benchmarks to investigate the performance and limits of backup systems. Two standardized hard disk environments were designed: one simulating hard disks used primarily for large databaselike files and the other simulating a disk divided into numerous subdirectories. We wrote assembly language programs to automatically and rapidly create these standardized environments.

BIGFILE.COM Many backup systems have difficulties dealing with the large files. To test for them, the program BIGFILE.COM was developed. It creates a hard disk environment containing a single 10,000,000-byte (exactly) file called BIGFILE.TXT. (Although 10-megabyte files are unlikely today, databases are getting bigger. Commercial software can easily create such files already.) Besides its use in measuring large file backup ability and speed, once BIGFILE.TXT is restored, it can be easily checked to determine the accuracy of the backup/restoration process. Another program, CHECKBF.COM, was developed to automatically check for such transcription errors.

SCATTER.COM To test the ability of backup systems to deal with elaborately structured DOS subdirectory hierarchies, we wrote the program SCATTER.COM to automatically create an inverted tree of 1,578 subdirectories and fill each one with two files. In all likelihood, no disk in use today is divided into such an elaborate subdirectory arabesque as SCATTER creates. However, the next generation of hard disks, with mass-storage capacities ranging into the hundreds of megabytes, makes such a structure possible or even likely.

Because each file and subdirectory SCATTER creates uses one allocation unit of hard disk space (a "cluster") and DOS 3.1 normally uses a cluster length of 4K bytes for 10-megabyte drives and 2K for 20- and 30-megabyte drives, a smaller version of SCATTER (making about half as many directories, 786) was used to test smaller disks. On disks with the proper cluster size, each SCATTER program requires somewhat less than 10 megabytes of disk space. However, some hard disks use 8K clusters (even under DOS 3.1) and cannot hold even the smaller SCATTER environment. As IBM indicates by reducing the hard disk cluster size in DOS 3.0 and later, such large allocation units should be avoided as wasteful of disk space.

HIGH FAILURE RATE In these evaluations, few systems were able to handle a SCATTERed hard disk, pointing out, in our opinion, weaknesses in the design of the backup systems. Any backup system for use under DOS should be able to handle any disk structure that DOS can generate. Further, the large number of drives unable to back up the SCATTERed files and subdirectories meant that rating their speed for handling that directory structure was useless for purposes of comparison. We therefore decided that for this round of testing, we'd simply indicate whether the system could handle the SCATTER structure file by file.

Both BIGFILE and SCATTER can also help measure hard disk performance (SCATTER particularly), and both give a readout of the time necessary for creation of their respective file structures. (SCATTER can require hours to generate its files.)—**Winn L. Rosch**

face would permit backups to be made without host intervention during the process (it could be in the background, but the hard disk would be inaccessible).

INSTALLATION AST has a reputation for good design and workmanship, and the AST-4000 continues in that tradition. The unusual but handsomely styled unit is assembled well. Unusual among the systems in this test series, AST-4000 was a breeze to install, requiring no more than 15 minutes, including format time. After the SCSI adapter card was slid into the host computer, only a single cable was necessary to link the host PC to the AST-4000. Of course, a good romp through the manual (recommended) will add hours of preliminary reading to that time.

Two years ago the AST-4000 would have ranked at the top of the list of combined hard disk/tape backup selections. Today it is only adequate, despite its trendsetting interface. The limitations, however, are in software, where innovations can readily be made. Despite its shortcomings, however, buying the AST-4000 today probably won't disappoint you, and software updates that might become available for the solid hardware foundation may remake the system into something genuinely great.—**Winn L. Rosch**

Storage Space DT01-03-01

Priam Corp.'s Storage Space DT01-03-01 has so much capacity it should be called Storage Warehouse. With a 75-megabyte

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IRMAprint. It allows just about any printer you want to work in the 3270 environment

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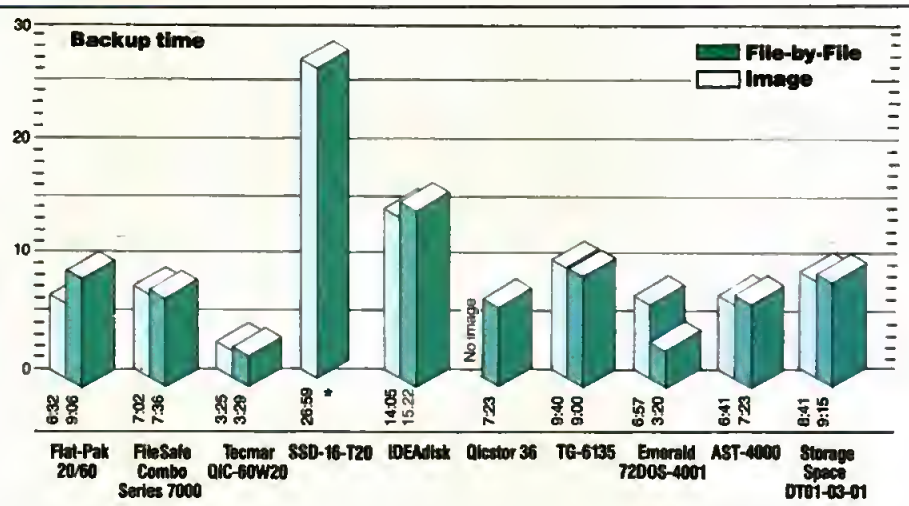
CIRCLE 541 ON READER SERVICE CARD

Benchmark Tests: Tape Backup Systems

BIG-FILE BACKUP

The **BIGFILE Backup** benchmark test measures the time it takes to back up and restore a file 10,000,000 bytes long. Times are given for both the file-by-file technique and the image technique.

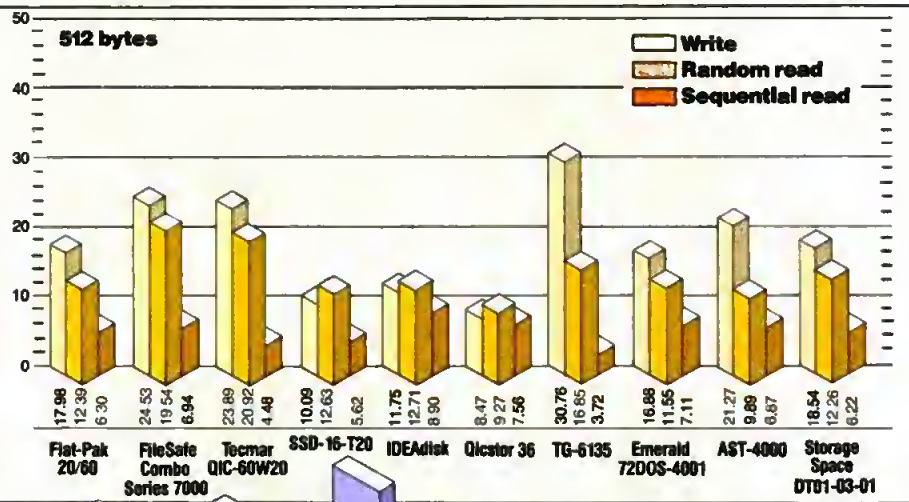
Times are given in minutes: seconds.



DISK INPUT/OUTPUT

The **Disk Input/Output** benchmark test measures the time it takes to create a 200K-byte data file using record lengths of 512 bytes and 578 bytes. The test program then performs a random read of 256 records from the created data file, followed by a sequential read of the same records.

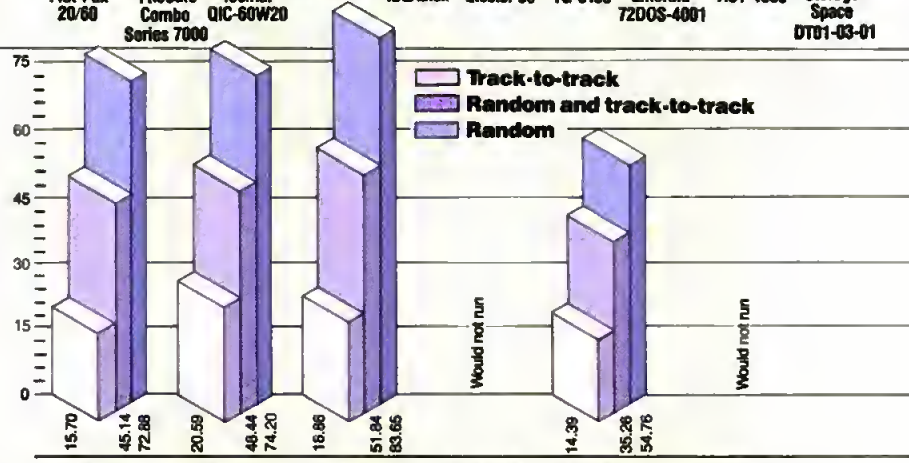
Times are given in seconds and decimal seconds.

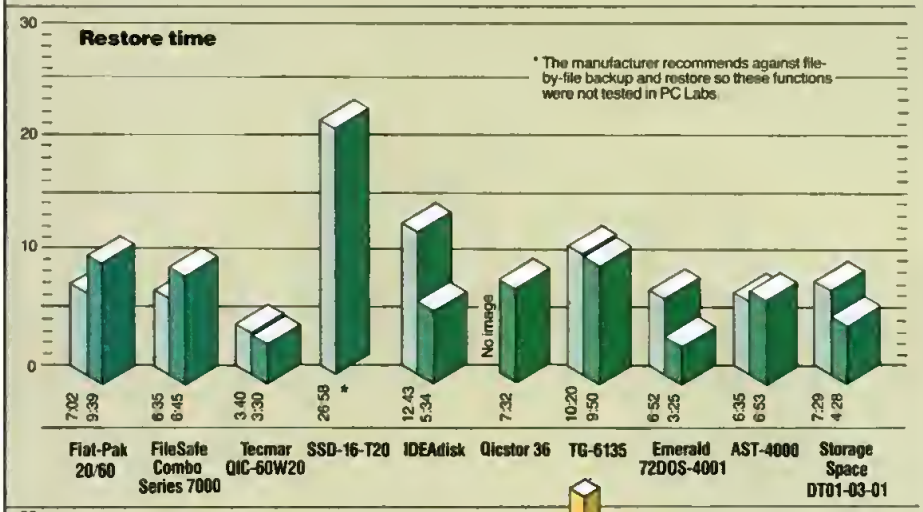


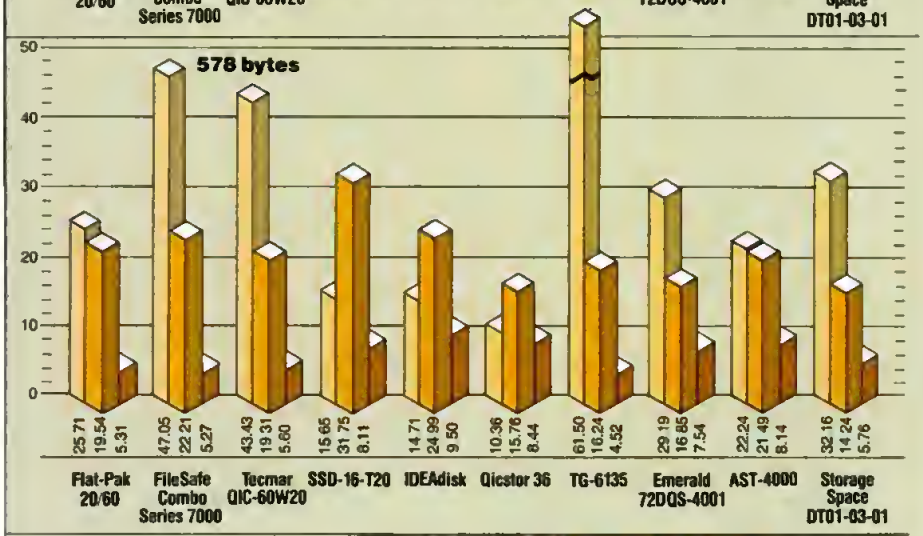
DRIVE ACCESS TEST

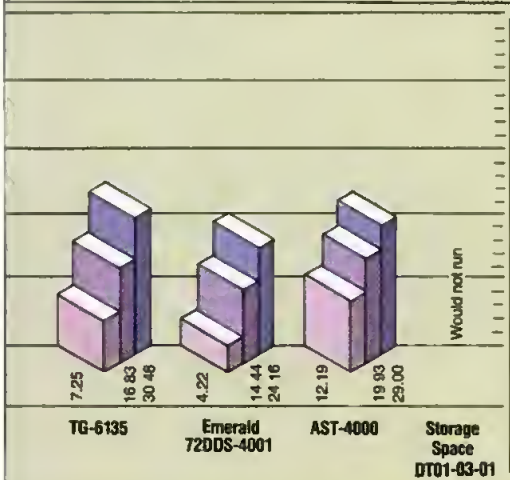
The **Drive Access Test**, written by Core International, measures a hard disk's seek time—the fundamental measure of how fast the drive responds to the disk controller's instructions. The types of seek, or access, times measured are *track-to-track*, or how long it takes the head to move to the adjacent track; *random*, or how long it takes to do a series of apparently nonsystematically selected track accesses; and *average*, the average of a series of random accesses.

Times are given in milliseconds.









SCATTER BACKUP

File-by-file

The **SCATTER Backup** benchmark test is a pass/fail test that indicates whether a system can back up a hard disk with a complex DOS hierarchy. The type of hard disk present determines whether the hierarchy contains 786 or 1,578 subdirectories.

Flat-Pak 20/60	No
FileSafe Combo Series 7000	No
Tecmar QIC-60W20	No
SSD-16-T20	No
IDEAdisk	No
Dicstor 36	Yes
TG-6135	No
Emerald 72DOS-4001	No
AST-4000	No
Storage Space DT01-03-01	No

For file-by-file backups and restorations, the Emerald 72DOS-4001 produced the fastest results, but they were not significantly faster than the second-place Tecmar QIC-60W20. Given the some amount of data, image techniques are usually faster than file-by-file transfer, but Tecmar takes the lead in image backups because it backs up only active data areas. The PC Magazine Labs SCATTER Backup test probes the limits of DOS compatibility, which is increasingly important as larger hard disks and more-complex directory structures come into use. Ten of the eleven external disk/tape backup units reviewed failed this test because they shortchange on the allowed complexity of disk directory structures. Only Alloy's Qicstor 36, which puts special emphasis on data interchangeability, could deal with the complex directory hierarchy. The disk used by Emerald is fastest, followed by the Tallgross and AST units. The SSD 16-T20, Qicstor 36, IDEAdisk, and Storage Space DT01-03-01 would not run the Drive Access Test because of system-level incompatibilities.

PC MAGAZINE EDITOR'S CHOICE

Although all of the units reviewed here have the same purpose, they differ substantially in function and features. The optimum choice for any system thus depends on what you need in storage and security.

If, however, we were free from such trifling concerns as cost, our choice would be the ***Emerald 72DOS-4001.*** *Its hard disk's huge 72-megabyte capacity is probably more than enough for any single system and will comfortably anchor all but the biggest networks. In testing, it proved to be the most trouble-free in both installation and use.*

The best dollars-and-cents bargain tested in PC Magazine Labs was Sysgen's ***Flat-Pak 20/60.*** *At roughly 60 percent the cost of its closest competition, it combines an adequately sized hard disk, good and relatively fast backup software, and trend-setting automatic backup abilities.*

Perched on a floor stand (too large for the desktop), the Storage Space—the most expensive unit reviewed—wins the prize for hard disk capacity (75 to 292 megabytes).

hard disk, 30 to 60 megabytes per tape, and a price tag of $7,995, the Storage Space is aimed at the serious computer user. Priam sells the same unit with either a 160- or 292-megabyte disk.

Standing 26 inches high, 9 inches wide, and 20 inches deep, Storage Space is too large for a desktop. It comes with a vertical floor stand and a 6-foot cable that is long enough for most setups.

EASY INSTALLATION The interface card is small enough to fit an XT's halfslot. Installing the Storage Space is simple. The two sets of DIP switches on the interface card come set to work on most systems. The installation manual asks you to double-check the settings, plug the card into a slot, connect the cable, and go.

Software installation is also easy and is explained well in the manual. You add a line to CONFIG.SYS, then set the partitions with Priam's software. The defaults will partition the disk into one 7-megabyte and two 32-megabyte sections. You can also create larger partitions if you first modify COMMAND.COM.

Two slightly different versions of the Storage Space are on the market. I found this out by accident. Because of an apparent problem with the first unit tested, Priam shipped a second one. Although the same model number, it was physically and electronically different from the first unit. If you have a service contract that involves swapping out parts, this incompatibility could be a problem.

■ At $7,995, the Storage Space is not an impulse item, but so dependable a unit may be worth every penny.

More troublesome is that the technical support people didn't know about the incompatibility. Tech support was also responsible for creating the apparent problem in the first unit. During a routine phone call after I had installed the unit correctly, an individual in tech support insist-

PC MAGAZINE FACT FILE

Storage Space DT01-03-01
Priam Corp.
20 W. Montague Expwy.
San Jose, CA 95134
(408) 946-4600
List Price: $7,995
Requires: Half slot for interface card, DOS 2.0 or later.
In Short: Priam's Storage Space offers an enormous capacity of 75 to 292 megabytes on hard disk and 30 to 60 megabytes on tape. Easy to set up and use, it cannot back up in the background but is fast enough to make end-of-day backup worthwhile.

CIRCLE 687 ON READER SERVICE CARD

Tape Backup Systems: Summary of Features

Model Manufacturer	List price	Disk capacity (bytes)	Tape type	Tape capacity (megabytes)	Compatibility: PC	Compatibility: XT	Compatibility: AT	Has extra expansion	DOS compatibility: DOS 3.1	DOS compatibility: FDISK	DOS compatibility: FORMAT	DOS compatibility: DISKP	Software control: Menu	Software control: Command	Backup modes: Image	Backup modes: File-by-file	Restores file from image	Has automatic backup	Appends file to tape	File-by-file options†	Has directory for tape	Is executable from backup	Backs up other disks	Restores to another directory/drive
Flat-Pak 20/60 Sysgen Inc.	$2,095	21,160,510	¼" cartridge	60	■	■	■		■	■	■	■	■	■	■	■		■	■	O A S H	■		■	■
FileSafe Combo Series 7000 Mountain Computer Inc.	$3,195	21,250,480	¼" cartridge	60	■	■	■		■		■	■	■	■	■	■	■		■	O S X H	■		■	■
Tecmar QIC-60W20 Tecmar Inc.	$3,495	21,204,992	¼" cartridge	60	■	■			■	■	■	■	■	■	■	■			■	D A S H	■		■	■
SSD-16-T20 Sunol Systems Corp.	$3,845	16,504,448	¼" cartridge	23.7	■	■	■		■				■		■	■	■		■	A S	■	■	■	■
IDEAdisk IDEAssociates Inc.	$3,995	44,355,584	¼" cartridge	60	■	■	■		■				■	■	■	■			■	O A S	■		■	■
Qicstor 36 Alloy Computer Products	$4,595	29,696,000	¼" cartridge	60	■	■	■		■				■	■		■	N/A	■	■	A S X H	■		■	■
TG-6135 Tallgrass Technologies Corp.	$4,660	35,000,000	¼" cartridge	60	■	■	■		■			■		■	■	■			■	A S X H	■		■	■
Emerald 72DOS-4001 Emerald Systems Corp.	$6,995	72,000,000	¼" cartridge	60	■	■		■	■			■	■	■	■	■		■	■	D S H	■	■	■	■
AST-4000 AST Research Inc.	$7,499	76,087,296	¼" cartridge	60	■	■	■		■			■	■	■	■	■			■	D A S H	■		■	■
Storage Space DT01-03-01 Priam Corp.	$7,995	75,000,000	¼" cartridge	60	■	■	■		■				■	■	■	■			■	O A S H	■		■*	■

N/A = not applicable †Selection options for file-by-file backup: A = by Archive bit O = by Date H = include/exclude Hidden files S = Search subdirectories X = Exclude certain files *File-by-file only

ed that I reset a DIP switch so that it no longer matched the factory settings.

The result was dismal performance, with the Storage Space taking over 30 minutes to restore PC Magazine Labs' 10-megabyte file. It was only after I got the same results on the second unit that tech support realized the DIP switch was set wrong. With the flick of a switch, the time dropped to under 5 minutes. This time is fast enough to make file-by-file restoration a reasonable proposition.

Once it's set up correctly, the Storage Space is easy to use. If you're using a PC, you can boot off the Storage Space hard disk. On an XT, you'll have to boot off the XT's internal drive.

The Storage Space's hard disk relies on an oxide recording medium and a servo/voice-coil head actuator. Automatic park-and-lock is a notable plus. The tape unit uses ¼-inch tape, in 30-, 45-, or 60-megabyte cartridges. The tape-recording technology uses nine tracks and serpentine recording, with CRC, read-after-write, and QIC-24 error correction.

The software for the Storage Space allows two kinds of tape backup. The menu-driven PDISK program makes disk-image backups of the entire disk or your choice of partitions. It will only work on the Storage Space disk, however.

The command-based TBACK and TREST allow file-by-file backup and restoration on either the Storage Space disk or the XT's disk. TREST will create subdirectories as needed when restoring files.

The Storage Space won't back up in the background throughout the day. But PC Labs' benchmark tests all came in at under 10 minutes, fast enough to encourage you to back up at the end of every day.

There is at least one troublesome bug in TBACK. Where DOS allows pathnames of 63 characters, TBACK allows a maximum of 63 characters for pathname, plus drive designation, plus filename. This limit means you can create a directory structure that stops TBACK cold in its tracks. According to Priam, this problem will be fixed in the next version of the software.

At $7,995, the Storage Space DT01-03-01 is not an impulse item, but if you need a single large hard disk for your 30-megabyte data files and the reassurance of a dependable tape-backup system, the unit may be worth every penny.

—M. David Stone

Winn L. Rosch is a contributing editor of PC Magazine. *Phil Wiswell, Robin Raskin, Vincent Puglia, and M. David Stone are all frequent contributors.*

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BREAKING THE MOLD

CREATIVE SOFTWARE SOLUTIONS

This is a paean to innovators. Not those whose names have practically become household words, like Lotus Development Corp.'s Mitch Kapor or Microsoft's Bill Gates. You're not likely to have heard of David Bailin, T. Scott Brumley, or Ted Kuklinski, but they, along with many others in business and professional life, are the soul of innovation in the workplace. One man turned a run-of-the-mill, conservative computer system at a multinational oil firm into a completely integrated data-sharing center. Another built a unique *1-2-3* template. A third unlocked the beautiful mysteries of professional graphics on the PC. In short, each of them creatively stretched the limits of the typical PC application beyond the ordinary.

While the backgrounds of these users are dissimilar—Bailin is an executive, Brumley, an accountant, and Kuklinski, a computer scientist—their accomplishments share a common theme. In rejecting the lowest common denominator and the given boundaries of hardware or software, these PC users have broken through the limits of elementary computing and taken it to its next logical step. Some of the applications they've designed are so simple as to be almost obvious—but their obviousness became apparent only in retrospect, after they invented the new applications described here.

The thousands of off-the-shelf programs available for the PC can make our lives very easy. The following three stories focus on individuals who weren't satisfied with easy answers. After you read about their achievements, you may have a new perspective about the work you do and the tools you use to do it. Are they the best tools for the job? And do you have the imagination to make them work harder for you?

INCORPORATING A NETWORK Almost lost in the swath of red-brick buildings that line the Exxon International campus in Florham Park, New Jersey, is a suite of offices with a PC environment so colorful it has brought renewed life to the endless statistics its computers crunch. Behind this corridor of high tech is a team of innovators with a philosophy that might sound like her-

esy to a data processing manager.

"I've read all the articles and heard all the propaganda that claim the true value of the PC in a corporation is gained by linking it to the mainframe, but this is not the only solution," says David Bailin, Exxon International's operations support manager. Bailin oversees the PCs used in the Supply and Transportation departments of the oil firm's Florham Park center. "There's a significant amount of data that never needs to go near the company's mainframe—information that would just get lost there and fail to be of any value to anybody."

Bailin, a 46-year-old Australian with a high energy level, was assigned to his present role in Florham Park in 1984. His task was to pinpoint the computer support needed by the analysts at the site. Bailin's group tackled Supply Planning Activities first, a department in which analysts prepare monthly and quarterly supply-and-demand forecasts. These forecasts are then used to compare the projected need for international crude with the expected availability of the oil for each Exxon region.

Producing these reports requires a significant amount of interplay among the various analysts; statistics are shared and steps reiterated for separate projections. Historically at Exxon International, the analysts used dumb terminals tied into the corporate mainframe to assemble their forecasts, but this approach was scrapped in 1982 to reduce costs and because it failed to provide the degree of flexibility that the Exxon International business analysts required. One possible successor to the mainframe environment was a series of standalone PCs running spreadsheets. Twenty such units were already in place at Florham Park, feverishly analyzing data entered manually, when Bailin became operations support manager.

But to Bailin's mind, individual PCs were as unsuited to his analyst's needs as the mainframe environment had been. "A standalone PC with spreadsheet software is a personal mainframe, and that is far from the best possible computer setup for an individual business analyst who needs to share data," says Bailin. "You don't want analysts to have to manage their own computers, but that's what you're imposing on them with a personal mainframe arrangement. You want them to have local computing and to be facile with the language of their application, but you also want to rid them of the task of administering the computer."

■ Recommending a local area network to Exxon International was a spark of creativity laced with genuine risks.

What's more, according to Bailin, using a spreadsheet in a standalone PC environment encourages "data and numerical fiefdoms" in which everybody controls his own information and even defines it with personal labels and shorthand. Any sharing of this data without reordering it extensively is effectively ruled out.

THE LAN SOLUTION Bailin and his team concluded that a local area network was the best computer solution for the Supply department for two principal reasons: "With a LAN you have local computing, but you also have centralized administration, applications, and data," he says.

Recommending a local area network to Exxon International was a spark of creativity laced with genuine risks. The LAN product category's dismal record in the personal computing marketplace was one strike against the plan. In addition, Exxon requires that before a PC is brought into the company, a stringent cost-justification analysis be prepared to show that the computer and its software environment will pay for themselves within 1 year.

Bailin and his team felt that the company would realize the value of a local area network once one was established and, more important, that it would be im-

Exxon International's David Bailin (left) suggested networking the PCs on which analysts prepare supply-and-demand forecasts. IDEAS *(right) is the software that lets the commercial spreadsheet, database, and word processor that run on the LAN interact.*

Photograph: Laura Dwight

pressed by the nearly immediate financial benefits a LAN would bring. The first chore in setting up the LAN was to replace the mainframe with software more relevant to the department's needs—specifically, with software that is adept at operating within data-sharing networked environments.

The PC software chosen was *TM/1*, a multidimensional, multiuser spreadsheet and table manager from Sinper Corp. *TM/1* keeps its data in a central database that is accessed by its spreadsheets. A number that ultimately appears in 20 different spreadsheets still exists only once in the database from which it is imported. It becomes part of the central pool of information that the analyst can choose from. Moreover, the number in the database is labeled with simple English statements that aptly and specifically describe it. Also available on the network are two other packages: the database manager *Team-Up* and the word processor *MultiMate Advantage*. The network Bailin chose to carry this software is 3Com's *Ethernet*, because of its respected central file server and the company's size and excellent track record.

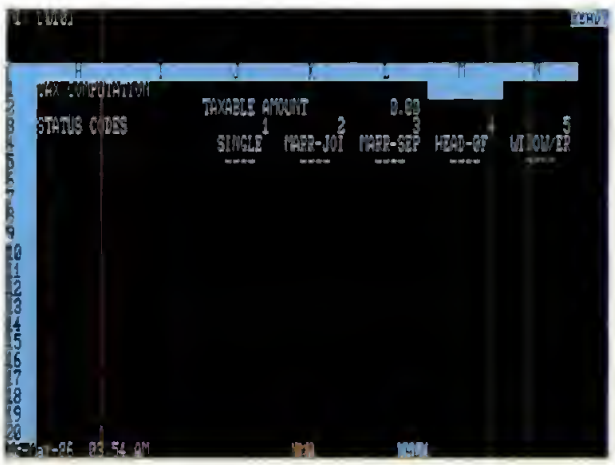
Two of Bailin's analysts, David Zolla and Fred Perry, wrote *IDEAS*, the software that lets *TM/1*, *Team-Up*, and *MultiMate Advantage* interact. The effort took them approximately 30 days. The result is a high-security, yet open, data-sharing environment: a 50-connection local area network running on two file servers, one 70 megabytes and the other 36 megabytes. The system insulates users from DOS, handles all file and printer links automatically, controls access to applications software, and provides on-line help and documentation. Users are able to share information with each other and understand each other's data at a glance because each analyst is inextricably bound to the same definitions and labels representing the same numbers in each spreadsheet.

"It took us much less than a year to pay back the costs of installing the local area network, and in our first year of using the LAN we reduced our computing costs by $300,000 from what it cost to run these applications on the mainframe," says Bailin. "But the rekindled enthusiasm for the job among the analysts, now that they have a tool that works for them, is worth more than you can quantify. It may not show up in the bottom line, but a company that moves 3 million barrels of oil each day cannot remain on top without analysts working at the top of their craft."

The Supply and Transportation department's LAN is far easier to use than a standalone PC environment, yet it offers the same advantages. After a user turns on his computer and enters his password, a menu appears on the screen giving him the choice among *TM/1*, *Team-Up*, and *Multimate Advantage*. After picking a program, he can load any file that resides in his personal storage bins. In addition, he can direct files to colleagues' mailboxes or send them to the printer for output. To use programs other than the three that reside on the LAN, he simply asks the network to return him to DOS and puts his program disk into the drive: he now controls the PC without any network involvement.

With the success of the Supply department under its belt, Exxon is now a confirmed believer in local area networks as an alternative to mainframe or standalone PC environments in large corporations. Bailin's next plan is to expand the scope of the LAN to cover the Transportation Planning Groups and to extend its reach to allow it to communicate with local area networks in other buildings on the Florham Park campus. "When installing a LAN, you really have to work hard and plan well to make it work for you," says Bailin. "But once it works, the benefits are so great that it is worth it all."

TAXING 1-2-3'S ABILITIES Call T Scott Brumley an innovator and the CPA from Charlotte, North Carolina, will deny it. He will admit, though, that he is persevering. He had to be to spend 2 full weeks in late 1984 turning *1-2-3* into a full-fledged tax-preparation program. Brumley's *1-2-3* template not only calculates every line in the federal tax forms but also prints out each schedule to the exact specifications of the IRS.



T. Scott Brumley (left), tired of the repetitive keyboarding his CPA duties entailed, customized 1-2-3 to create a tax-preparation program that calculates federal forms and generates printouts the IRS will accept.

Photograph: Tom Walters

WHEN TO GIVE UP ON THE SOFTWARE YOU LOVE

The arguments against weaning colleagues off one applications program and introducing them to another shouldn't always prevail. Sometimes a creative switch makes good business sense.

When your applications software isn't doing the job, sometimes the creative solution is to recognize the problem and find new and innovative software that will.

When Mike Perry, vice president and controller of the A.H. Belo Corp., switched from *1-2-3* to Javelin Software Corp.'s *Javelin*, it made a real difference in his department's efficiency. *Javelin*'s talents as a financial modeler that separates the model's logic from its spreadsheet cell structure are the reason. (See "Javelin: A New Modeler Takes Aim at 1-2-3," *PC Magazine*, Volume 5 Number 5.)

At Belo, a publicly held communications company based in Dallas, Perry's eight-person staff prepares monthly and yearly financial plans and models and detailed monthly forecasts for the company's eight newspaper and broadcast subsidiaries. Until recently, Perry's department did all this work using chiefly *1-2-3*. The problem was, he says, that the models were so large and so complex that even minor changes caused unintended glitches as these changes "cascaded" through the model.

"When designing a spreadsheet," says Perry, "you have to deal with the data, the logical and mathematical operations on that data, and the formatting of reports all at the same time, and in the same worksheet space. In large models it's difficult to keep in mind all the logical interrelationships, especially since they are hard to document. The variables are not necessarily defined in English, and most of the time their identity and meaning depend on their position."

Although you can use named ranges and variables in *1-2-3*, Perry says, the program doesn't require it. The kind of freewheeling model design you can do in *1-2-3* is appropriate for small, ad hoc models, but for the large models his department creates, it's inefficient. On his staff, several people have to use the same model or download data from one model to another. They need to be able to read and understand one another's models.

Perry looked into add-on products for *1-2-3*, tried reeducating people to use named ranges and variables, and experimented with a mainframe-type financial-modeling package ported to the PC, Ferox Microsystems' *Encore*. None of his efforts proved satisfactory.

THE LOGIC OF JAVELIN Finally, he discovered *Javelin*. Like *Encore*, *Javelin* separates the variable definitions and model logic—its formulas and report definitions—from the spreadsheet cell structure. However, it is much easier to learn and use. One person can follow another's model because the variables are defined in English, and the program's many "views" of the data make it easy to follow a model's structure.

Since Perry's staff began the switchover to *Javelin* last November, communication of models and information among staff members has improved. Eventually he hopes all eight staffers will convert to *Javelin*, as well as financial analysts in the company's operating units; he'd like them to submit their financial plans and actual numbers in *Javelin* by modem. Perry himself has been using *Javelin* for some sophisticated acquisition analysis. Although *Javelin* has some drawbacks—its date math functions are not as easy to use as *1-2-3*'s, for example—it has gone a long way toward solving Belo's model coordination problem.

PARADOX IS THE ANSWER Like Perry, Jim Hansel had run smack into the limits of a traditional application. Hansel, vice president of Chase Investors Management Corp., is responsible for evaluating and implementing technology for his company, which picks and tracks investments for large institutions like pension funds. Chase Investors had been using *dBASE II* and *III* for tracking such back-office details as brokerage commissions and for producing clients' performance analysis reports. But the company found *dBASE*'s programming language cumbersome at both ends of the scale: it was too difficult for nontechnical users to design queries of more than one database file and too time-consuming for Chase Investors' programmers to design high-end applications.

The result: few people brought their data-management problems to the PC. Then Hansel discovered Ansa Software's *Paradox*, a powerful, programmable database manager that offers a spreadsheetlike, interactive interface that permits complex queries. *Paradox*'s combination of a sophisticated, *dBASE*-like programming language and an easy-to-use interactive interface has changed things at Chase Investors, Hansel says. (See "Paradox: A Database Manager with a Familiar Face," *PC Magazine*, Volume 5 Number 1.)

"It's quite practical and even fun for ordinary users to work with multiple files of their own devising in *Paradox*'s interactive mode," he says. "There's no programming, no commands to compose: they just move the cursor around *Paradox*'s spreadsheetlike outline of the file structure and use the function keys to check off what they want. If you make a mistake, *Paradox* tells you right away."

Most people at Chase Investors use *Paradox* for mundane tracking of accounts and responsibilities—"all the things that make a business run smooth-

ly," says Hansel. But Chase Investors' programmers also make good use of *Paradox* to develop extremely sophisticated applications like portfolio construction and portfolio management that they wouldn't have tried in *dBASE* because of its "performance and development time problems." He adds, "We can do a lot even without using the *Paradox* programming language."

The thing that impresses him most about *Paradox*, says Hansel, is that it's the first DBMS he's seen for the PC that is powerful enough to permit construction of truly "normalized" relational databases. Normalization is a mathematical process that makes a database independent of the application for which you developed it. It's useful, Hansel says, "if you want to look at your data later in a different context than you originally anticipated. *Paradox* makes that pretty easy to do even without programming."

About 20 of Chase Investors' 150 employees are now using *Paradox*, and, although productivity increases are hard to quantify, Hansel says, things are running more smoothly. "It puts computing power directly in the hands of the person responsible for business functions, without the overhead of trained programmers."—**Janet Lewis**

PC MAGAZINE FACT FILE

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Javelin Software Corp.
One Kendall Sq., Bldg. 200
Cambridge, MA 02139
(617) 494-1400
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Paradox
Ansa Software
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Belmont, CA 94002
(415) 595-4469
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CIRCLE 546 ON READER SERVICE CARD

When Brumley, 27, first bought an IBM PC in 1983, he used *1-2-3* only to do the cumbersome mathematics involved in preparing the tax returns of his 50 clients. "It saved me from doing the tedious mathematics, but I still had to transfer each calculation onto the tax form by hand," says Brumley. "This quickly proved to be a less than ideal arrangement.

"Because *1-2-3* could only print out its tax calculations as they appear in the spreadsheet, each time I wanted to get even an interim overview of the client's tax situation—perhaps in order to decide how to handle a new piece of income or to analyze the effects of various depreciation strategies—I would have to write the figures onto the tax forms by hand.

"Often—and usually just after I manually transferred all the data from *1-2-3* over to the forms to send to the IRS—the client would call in a panic with additional information to include. *1-2-3* made it easy enough to recalculate the client's taxes at this point, but after the new calculations were completed, I would have to manually transfer the information again to fresh tax forms. The time all this took when I used a pencil as my printer almost negated the time *1-2-3* saved me in number crunching."

After weathering the 1984 tax season, Brumley set out to overcome the limitations of *1-2-3*. Piece by piece, as though assembling a jigsaw puzzle, he replicated the layout and formulas of the federal tax forms on the spreadsheet. For the sake of program economy, he first put abbreviations describing each line of the tax return into *1-2-3*'s left-hand column. He then put the data or calculations that corresponded to each of these descriptive phrases in the next column to the right.

Brumley then wrote a macro that commanded *1-2-3* to print out each page as a unit with a balance on its bottom line, so forms could be selected and printed separately. Additionally, when he gave the command to print, he directed the program to output only the right-hand column because the abbreviated phrases in the leftmost column did not exactly match the IRS headings. For instance, line 7 of the IRS's Form 1040, which reads "Wages, salaries, tips, etc.," might appear as "Wag-Tip" in Brumley's spreadsheet. Finally, when his program produced a printout that contained the exact order and placement of the tax data, but no left-hand descriptive phrases, Brumley created for each form a stencil that he could place next to the corresponding data and then photocopy. The result was a complete set of ready-to-mail federal tax returns.

"I now have the best of all worlds," says Brumley, who was somewhat surprised at how easy it was to broaden *1-2-3*'s capabilities. "In one program, I have a powerful spreadsheet that I can use for any financial projections and a super tax-preparation program that the IRS finds acceptable, one that I can update myself at no additional cost each year as tax conditions change. I now have all the time in the world to go after new clients without worrying about how I am going to find the hours in the day in which to do their returns."

MASSAGING PC GRAPHICS Seven years ago Ted Kuklinski was a graduate student in computer science at Massachusetts Institute of Technology, studying the arcane science of pattern recognition. An offshoot of artificial intelligence, pattern recognition examines the process by which "smart" computers recognize abstract drawings as definable real-world icons. It solves such problems as making a machine see handwritten characters as alphanumeric symbols.

This area of research led Kuklinski to a job at Pencept Inc. of Waltham, Massachusetts, where he was a principal scientist on the design team that created the Penpad, a highly respected graphics tablet that digitizes drawings and even written alphanumerics and outputs them on the PC monitor (see "Hardware: Firm Support for CAD," *PC Magazine*, Volume 5 Number 5). Most of the developmental work at Pencept was conducted on a mainframe computer using the UNIX operating system. Yet with all that computing power at his disposal in those years, it wasn't until the release of the PC and Pencept's subsequent embracing of MS-DOS for the Penpad operating system that Kuklinski began to learn the full capabilities of computer graphics.

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graphics power than was available in my MIT graduate research laboratory and in the mainframes at Pencept a scant few years ago," says Kuklinski, 36, a resident of West Newton, Massachusetts. "Even though the initial graphics offerings on the PC were low resolution, just being able to access computer graphics so easily and with so much local control quickly weaned me away from the mini-mainframe time-sharing environment."

But the flexibility and control PC graphics affords carry with them a challenging by-product. The options for producing graphics are so great that picking hardware and software that fit the task at hand and that complement each other well is almost more important than the user's dexterity. A dazzling array of printers, plotters, graphics cards, digitizing tablets, paint software, and color monitors are available to PC graphics users. The ability to use them correctly separates the geniuses from the hacks. "The biggest factor in PC graphics is putting together the right combination of hardware and software to achieve output in the form that you want," says Kuklinski.

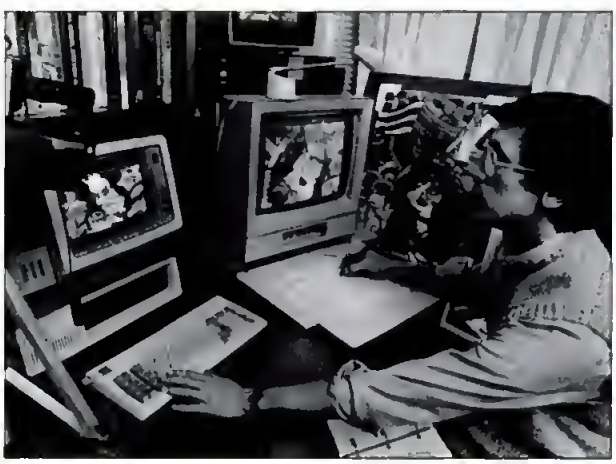
This is where Kuklinski excels. Whether he is bringing a computer-generated image done in the old Japanese china-plate impressionist style into stunning 16-color contemporary focus or turning a video image of a model Ferrari into a black-and-white newspaper-type picture of a funny car with rough, sandpaperlike brush strokes, Kuklinski has mastered the art of using PC graphics tools to suit the illustration to the medium.

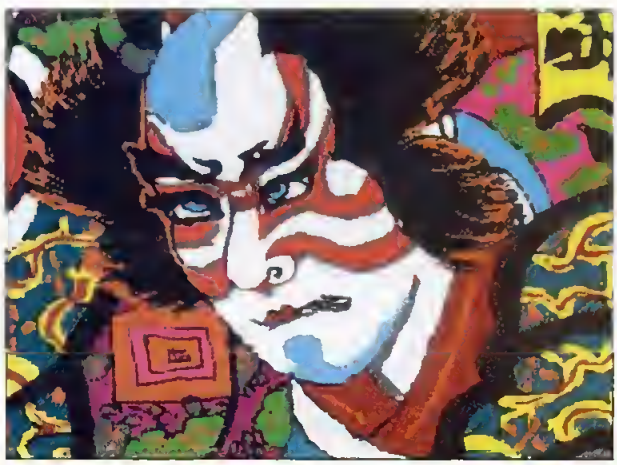
A LUCRATIVE BUSINESS Moreover, Kuklinski has turned this skill into a lucrative computer graphics consultancy, taking on an array of jobs at $35 an hour. He has, for example, prepared computerized slide-show presentations for software houses, sequencing program screens, company logos, and assorted animation to form the centerpiece of an animated promotional brochure. For a securities forecasting firm, he has generated high-resolution graphs from a financial database: market trends and the histories of individual stocks literally emerged from more general overviews of the performance of industry sectors. Kuklinski has also presented workshops on PC-based graphics, in which he typically connects a video projector to the computer screen and then annotates the image on the monitor with a graphics tablet.

"I'm applying the graphics tricks that I've learned over the years to other people's problems," says Kuklinski. Kuklinski's tricks on the PC are, indeed, full of high-tech legerdemain. Take the image of the Asian man, which he calls "Japanese Kite." It originated as a line drawing created with the Penpad digitizing tablet, along with a graphics program and color adapter card that have both been discontinued since that time. Because the software lacked such important advanced features as on-screen icons and the ability to rotate and flip the image and the color card's resolution was far too low for sophisticated computer art, Kuklinski reproduced this elegant drawing in a higher resolution using the *Dr. Halo II* paint program from Media Cybernetics and the Graphics Master 600 by 400 16-color adapter from Tecmar. But to facilitate the transfer of the low-resolution image into the high-resolution hardware and software environment, Kuklinski had to write a short program.

"*Dr. Halo II* is good at moving images between different graphics cards, so it was perfect for my needs in this case," Kuklinski explains. "But I had to design a short routine that essentially told the program to change the original drawing into one with twice as many lines and twice as many columns. Writing this sort of translating program is a typical part of my job. It's just a loop, usually fewer than 100 lines of code, that says, 'Read this pixel in as such—a lower-resolution location—and read it out as this—a higher-resolution location.' Writing a routine of this sort is a necessary inconvenience if you're trying to move something from one format into another."

With the drawing upgraded, Kuklinski provided the finishing touches, filling in and smoothing out the picture with *Dr.*





Ted Kuklinski (left) designed a lucrative computer graphics specialty: he creates images like the one at right, done in the Japanese china-plate style, using the combination of commercial hardware and software he considers best suited to the medium.

Photograph: Lee Lockwood

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Halo II. Printing it out, though, presented a new challenge. Because he wanted to use Quadram's Quadjet color ink-jet printer, he hit the additional snag of outputting the 16-color picture on an 8-color printer. To overcome this, he wrote another short BASIC loop that reads the 16 colors and then, as Kuklinski puts it, "dithers them. By mixing colors at each pixel, it simulates a 16-color drawing with only 8 printer colors."

The outcome is beautiful and lavish, a testament to Kuklinski's uncanny ability to work with an image through different PC computer environments until it can be correctly reproduced. He has repeated this feat numerous times and with other hardware and software. Once, he translated a picture created on a paint program into a form that could be read by computer-aided design (CAD) software. With CAD power at his fingertips, he was able to zoom in or enlarge different portions of the drawing, analyze them, and convert them before printing out the drawing.

Kuklinski believes he has found a unique niche as a PC graphics artist. "There is no artistic medium around that doesn't have its limitations," he says, "but there are few that are as versatile as computer graphics."

SUPPORT FOR CREATIVITY The key to PC innovation is a willingness to listen to and learn from the advice of those most familiar with the application being developed. A primary source of help for the most creative PC users is the support of the hardware and software manufacturers themselves. Technical support is an immense help in sorting through the minor and sometimes major bugs that crop up when you alter or extend the breadth of a product. "Often the documentation is behind the product," says Kuklinski. "Take the case of *Dr. Halo II*. Media Cybernetics keeps enhancing the software, but somehow the enhancements often fail to work their way into the manuals. A quick call to the company's technical people sorts out the confusion."

Some software publishers and hardware manufacturers confound this process by attempting to shove off product support on their dealers. 3Com Corp., for instance, recently began to shift its customer-assistance program from the firm's headquarters to product salesmen on the local level, a policy change that has led to increasing dissatisfaction among the most sophisticated users of the 3Com local area network.

"My expertise and that of the local salesmen are quite different," says David Zolla, the PC guru at Exxon. "Many of these salesmen were working in shoe stores just 12 days ago, and I usually have to explain to them what I'm talking about when I ask a question. They then have to call the manufacturer and get back to me with an answer. The result is a 1-day turnaround for each question that could be answered in 10 minutes if I spoke directly to the 3Com technical people."

Innovation, in many fields, is a private endeavor, with each solitary inventor working on one invention. Among PC users, however, sharing information freely about unique tips and enhanced applications is as ritualized as the house rule in poker that a winner cannot leave the table without giving the losers a chance to recoup. Only when creative users share their innovations can the PC community truly reap the benefits.

David Bailin, T. Scott Brumley, and Ted Kuklinski welcome comments on their PC achievements. Write to them in care of PC Magazine, *One Park Avenue, New York, NY 10016.*

Jeffrey Rothfeder, a free-lance writer based in New Jersey, is the author of Mind over Matter *(Simon & Schuster).*

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Media Cybernetics
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(301) 495-3305
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Solon, OH 44139
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PROJECT DATA BASE II

In the second part of our project, we examine flat-file databases. Although these were once considered strictly for personal use, many have now reached a level of sophistication and complexity worthy of most business applications.

FLAT-FILE DATABASES

Although we are all fascinated by flashy and high-level software, it is wise to heed the familiar dictum "Simpler is better." Flat-file databases, unlike the more complex relational products, are constructed to do one basic job very well—to accept, reorganize, and report on information. But although flat-file databases may not link files or possess programming languages, they should not be underestimated by either individual or corporate users.

Many of these "simple" products boast complex user interfaces that make manuals almost unnecessary; incorporate complex criteria for data entry, mathematical functions, and sorting facilities; produce sophisticated report forms; and even include some relational abilities.

In the following pages we look at 26 of these flat-file databases (more will be examined in Volume 5 Number 14). They have all been subject to the same expert scrutiny that was given to relational databases in our last issue, including the performance of a typical business application using a short "employee" file (we had to restrict ourselves to 25 names to accommodate products without importing capabilities). You will find complete information on each database in our features chart, followed by more-subjective comments by our reviewers.

Take a good look at these products, especially if your database needs are relatively straightforward. After all, why try to harness an elephant when a horse will do just as well? —**Barbara Krasnoff**

FLAT-FILE DATABASES

		File Structure Limits					Data Types and Sizes										Times in Seconds						Data Entry and Editing									
PRODUCT NAME	PRICE	Number of fields per record	Record size	Records per data file	Records per database	Field size	Characters	Numeric	Integer	Floating-point	Money	Logical (Boolean)	Date	Time	Long text	Sort data file by last name	Index records	Retrieve and display record with index	Retrieve and display record without index	Execute entire report	Sort data file by salary	Range testing	Default values	Require specific values	Lookup to external data table	Double entry verification	Required fields	Must fill field	Forced uppercase	Date conversions	Automatic incrementing fields	Unique fields
Apollo	$ 250	10000	20000	∞	∞	20000	■	■	■	■	■	■				2.04	NA	NA	2	28	2				■							
PC ClearCut	49.95	512	262144	65000	65000	512	■						■	■		0.77	NA	NA	0.62	3.67	1.14	■										
The DataFiler	79	45	1000	1800	1800	65	■	■	■	■		■				90	144	48	NA	10	45	■	■	■			■		■			
DBS/Experience	$195	50	1000	∞	∞	255	■	■	■							16.4	2.1	10.2	1.7	300	23	■										
Electric Desk	345	50	1000	65000	65000	79	■	■								NA	4	2	3	34	NA								■			
Executive Card Manager	295	2000	26000	64000	64000	80	■						■	■		7	NA	3.3	6	2	9											
Fastfile	49.95	50	1024	LC	LC	40	■	■	■		■		■			18.67	NA	NA	18.35	24.38	21.59	■	■	■			■					■
Filebase	125	40	4096	32767	32767	255	■	■	■	■	■		■		■	10.29	0.02	NA	NA	10.60	NA				■	■						
File Express	40	40	2400	32767	32767	60	■	■	■	■	■		■	■		4.04	NA	NA	NA	8.49	5.10			■								
File Plan	199.95	32	1024	32768	∞	100	■	■	■	■	■		■		■	8.31	5.24	NA	NA	2.4	NA	■		■	■							
Filing/Reporting Assistant	**278	3200	32	∞	∞	1680	■	■					■	■		1.9	NA	NA	NA	28	28		■									
First Base	195	36	32767	32767	32767	258	■		■	■		■				32	11	5	5	109	NA		■									
PC Infoscope	79	255	255	8196	8196	255	■		■		■	■	■	■		1	NA	NA	1	60	1										■	
PC Nutshell	150	60000	16M	2B	2B	16M	■	■	■	■	■		■			2.08	NA	1.09	1.09	9.60	2.45	■		■	■		■	■				■
Omnifile	425	64	36560	LC	NA	1828	■	■	■	■			■		■	16	4	0.5	0.96	9.8	11	■	■	■	■		■	■		■		
1-2-3, Release 2	495	256	8191	8191	8191	240	■	■	■	■	■	■	■	■		1.31	NA	NA	60	1.41	1.75		■									
OWL A-B-C	240	21	1500	1000	NA	72	■	■								0.05	NA	NA	0.48	0.79	0.09		■									
PC-File 'N Report	59	99	2000	LC	LC	67	■	■			■					7.5	NA	NA	2.5	14.3	18.2	■			■							
PFS: File and PFS: Report	**265	3200	53706	2200	2200	53706	■	■	■	■			■	■	■	3.46	NA	NA	1.34	5.25	6.14											
Please	349	99	2000	16M	NA	999	■	■		■		■	■			NA	132	1.6	4.7	15.3	15	■	■				■		■		■	
Pounce	495	32	4096	65000	∞	765	■	■								†56.5	6.5	0.06	56.5	240.5	NA											
Private Files	188.95	80	1520	65000	NA	80	■	■		■						NA	65	0.3	NA	7.9	11.8											
Rank and File	195	250	6840	65500	65500	76	■	■			■	■				2.5	NA	NA	0.01	24	2.5					■						
Super*List Manager	195	23	254	∞	∞	30	■	■			■		■			3.21	NA	NA	3.08	100	4		■	■							■	
Symphony	695	32	7680	8191	8191	240	■	■		■	■	■	■	■		1	NA	NA	1	2	2	■	■	■	■	■			■	■	■	■
T.I.M. IV	245	40	2400	32767	32767	60	■	■			■			■	■	22	7	5	7	47	2.9		■		■						■	

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	Data Import/Export												Data Manipulation																Command Strategy														Disk Requirements			Support Material					
																													Static menus with:			Dynamic menus with:			Typed commands							Number of distribution diskettes			Tutorial					
	Automatic data entry	Calculated fields on entry screen	Carryover data from previous record	Error processing	ASCII	DIF	DBF	PFS	SDF	SYLK	WKS	User defined	Indexing	Number of index files	Compound indexes	Index values must be unique	Can respecify indexed field(s)	Can respecify file definition	Sorting	Number of sort fields	Ascending order	Descending order	Maximum number of open files	Multiple record deletions and updates	Math updates	Text updates	Table merging	Maximum number of tables merged	Function keys	Ctrl or Alt key combinations	"Point to command, press Enter"	Specified single key	Function keys	Ctrl or Alt key combinations	"Point to command, press Enter"	Specified single key	Whole words	Abbreviations	Mouse/other input device	Floppy disk	Hard disk	KBytes occupied by program files	Total	Number required to run program	Copy protected	On-line help	Reference documentation	On-screen	Paper	Audiotape	Videotape
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◪ no import or export ◪ import ◪ export ◪ both import and export *poor **average ***good ****excellent

FLAT-FILE DATABASES

PRODUCT NAME	Input Facilities: Screen definition: Painting	Input Facilities: Screen definition: Coordinate specification	Input Facilities: Screen definition: Automatic	Input Facilities: Screen definition: Programming	Input Facilities: Number of screens per file	Input Facilities: Number of files per screen	Input Facilities: Prompt messages for fields	Output Facilities: Report Generation: Arithmetic functions	Output Facilities: Report Generation: Aggregate functions	Output Facilities: Report Generation: Statistical functions	Output Facilities: Report Generation: Multiple file reports	Output Facilities: Report definition method: Predefined mailing labels	Output Facilities: Report definition method: Painting	Output Facilities: Report definition method: Form layout	Output Facilities: Report definition method: Automatic	Output Facilities: Report definition method: Programming	Output Facilities: Report definition method: Stored report definitions	Output Facilities: Report definition method: Headers	Output Facilities: Report definition method: Footers	Output Facilities: Output reports to: Printer setup facility	Output Facilities: Output reports to: Printer	Output Facilities: Output reports to: Screen	Output Facilities: Output reports to: Disk file	Output Facilities: Query language: Multiple file access	Output Facilities: Query language: Stored queries	Output Facilities: Query language: Boolean expressions	Output Facilities: Query language: Phonetic searching	Output Facilities: Query language: Global searches	Special Features: DOS 2.0 directory support	Special Features: Change default directory	Special Features: Access from another directory	Special Features: Macros	Special Features: Customize keyboard	Special Features: Customize color screen	Special Features: User access security provisions	Special Features: Data encryption
Apollo	■	■			10	1						■		■							■	■	■													
PC ClearCut	■				6	1			■	■			■	■			■	■	■	■	■	■	■						■	■	■			■		
The DataFiler	■	■			1	1	■	■				■	■	■			■	■	■	■	■	■			■			■						■		
OBS/Experience	■				∞	1	■	■	■	■		■			■		■	■	■		■	■	■		■	■		■		■				■	■	■
Electric Desk	■	■			1	2								■			■	■	■	■	■		■					■	■	■	■	■	■	■		
Executive Card Manager	■	■			11	1	■		■			■	■				■	■	■	■	■	■	■			■		■	■	■	■					
Fastfile		■	■		1	1	■	■	■						■	■	■	■			■	■	■					■	■					■		
Filebase			■		2	1	■	■			■			■	■		■	■			■	■						■	■		■					
File Express			■		2	1	■	■			■	■			■		■	■			■	■	■						■	■			■			
FilePlan			■		∞	1	■	■	■	■		■		■	■		■	■			■	■	■				■		■	■	■			■		
Filing and Reporting Assistant	■				32	1		■	■			■		■			■	■			■	■	■						■	■	■			■		
First Base			■		1	1			■			■			■		■	■			■	■	■							■	■					
PC Infoscope		■	■		1	8	■							■	■		■	■	■		■				■	■	■	■	■	■	■	■	■	■		
PC Nutshell	■				2M	1	■	■	■	■		■	■	■			■	■	■	■	■	■		■					■	■	■			■		
Omnifile	■				∞	∞		■	■			■	■				■	■			■	■	■	■			■		■	■	■	■		■	■	
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PC-File'N Report	■				8	1		■	■			■			■		■	■			■	■	■											■		
PFS: File and PFS: Report	■				32	1		■	■			■			■		■	■			■	■	■							■		■	■	■		
Please	■		■		9	1	■	■	■					■	■		■	■			■	■	■				■		■		■					■
Pounce					NA	NA																								■	■					
Private Files	■				2	1		■	■			■		■	■		■				■	■	■						■		■					
Rank and File			■		5	1	■				■		■			■	■	■	■	■	■	■				■		■	■		■				
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Symphony	■	■	■	■	1	1	■	■	■	■			■	■	■	■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■		■		
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LEGEND: ∞—unlimited NA—not applicable PC—Indicates Editor's Choice

APOLLO

Any program whose namesake drove a chariot of fire across the sky is bound to be an automatic attention-grabber. *Apollo* earns attention for its features and performance, too. And, to top it off, this program is moron-proof—if it were any easier to learn and use, it would run itself.

Most of *Apollo*'s ease of use can be attributed to its user interface. In *Apollo*, all roads lead to the main menu. After you complete an operation such as designing a screen, sorting a database, or formatting a report, you save the results of your activity into memory, escape back to the main menu, and then go on to a submenu to print your work or store it to disk. At first this procedure seems a bit awkward, especially after you execute a sort, leave the sort screen, and don't hear the familiar whir of the disk drive saving your sorted database. But you get used to it when you realize that any operation you want to perform is no more than four or five keystrokes away.

Apollo takes uniformity one step further. The screens for its search, sort, and report functions are identical, consisting simply of that data file's record screen. No matter where you are in the program, the Tab key moves the cursor forward through fields, Shift-Tab moves the cursor backward, and F10 executes.

To perform a search, you fill in the data you want searched on in the appropriate fields, using the Right and the Left Parenthesis keys as right and left wildcards. The program searches for text that fits the designated criteria and calls the records to screen in their entirety; you page through them sequentially using the F10 key. You can print the record you have on the screen by hitting Ctrl-P.

EASY SORTS Sorts are also very simple. From the search screen, place the cursor in the field you wish to sort by and hit Ctrl-S. *Apollo* asks you to confirm and then prompts you to sort in either ascending or descending order, and it's off to the races. Searches, sorts, and reports in *Apollo* are lightning quick since you first load as much of the files you wish to work on as can fit into memory.

Also, *Apollo* has some features many Category 1 databases lack. For instance, you can program formulas into fields that use data from other fields to make calculations. And you can calculate data from more than one file, because *Apollo* can load two databases into memory at the same time, holding them in separate buffers that you can easily toggle between (from the main menu, of course). You must, however, remember to insert formulas in the same order in which you want them executed, which means that if you go in and change one formula, you must also rekey other equations that relate to it.

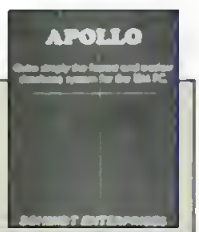
FEW REFINEMENTS The "refinements" department is where *Apollo* is most deficient. While most software has schemes to help save you from inadvertently fumbling unsaved data into oblivion, with *Apollo* you have to remember to go to the disk menu and save changes all by yourself. *Apollo* does not save automatically, nor does it remind you to save. Further down this dangerous road, the only documented way to exit *Apollo* is to reboot the PC—no warnings that you are about to lose several hours of keying-in or manipulating data. *Apollo*'s manual warns you that hitting Ctrl-Break will also remove the program from memory, as well as any data you might be working with.

A few other semiannoying limitations: editing functions are absent in *Apollo*. The only way to edit the data in a field is to write over it—no Ins, Backspace, or Del key, no nothing. And while *Apollo* easily imports and exports data in ASCII format, you must delimit all fields with quotation marks, as well as the standard commas. You create reports, confusingly, by turning off all the fields you don't want displayed or printed (by setting print/display margins to 0), rather than by turning on the ones you do want.

And in the best of Greek literary traditions, *Apollo* also contains a tragic flaw: it is copy protected. Written on the program disk is an ominous warning: "Attempting to copy will damage disk." The situation isn't as bad as it might be, though. Once you insert the key disk into drive A:, the program loads itself completely into memory, so you can file the disk away in a safe place and forget about it.

Yes, *Apollo* has a few flaws. Add the documentation to the other ones I've listed: although it is a thorough and easy-to-some added slickness—and minus copy protection—it would be a most attractive program. Copy protected.

CIRCLE 608 ON READER SERVICE CARD



Apollo's report screen does not differ in any relevant way from those for searching or sorting, except for the command prompts at the bottom.

PC MAGAZINE FACT FILE

***Apollo*, Version 1.0**
Schmidt Enterprises
7448 Newcastle Ave.; Reseda, CA 91335; (818) 342-5930; (800) 232-6777
List Price: $250 **Requires:** 128K RAM, one disk drive, DOS 2.0 or later.
In Short: A speedy and simple-to-use package with some features others in this category lack, notably math capabilities; with a bit more care for your data and

absorb tutorial, it's very difficult to use as a reference manual.

Still, *Apollo* is a pretty fair little package. If it were a bit slicker and a bit more careful with your data, and especially if it were not copy protected, its speed and simplicity would make it a very attractive program indeed, especially for manipulating simple accounts databases where its math capability would shine.

—Paul M. Stafford

CLEARCUT

If you are easily confused by all the "easy-to-use" database packages in your local computer store, there is an obvious choice; in fact, the choice is *ClearCut*. More than a cut above the average flat-file database manager, *ClearCut* offers a menu-driven interface, speed, and features usually found in much more expensive databases.

Although *ClearCut*'s file definition, data manipulation, and report generation operations are in separate areas, the program is consistent throughout. For example, you access similar features with the same function keys. A menu bar on the bottom of the screen displays the choices. A reasonable amount of context-sensitive help is also available.

ENTRY FORMS Designing an entry form is relatively straightforward: you paint the borders, labels, and text wherever you wish and define fields by hitting the F1 key for as many times as there are characters in the field.

ClearCut even supports four graphics character sets for drawing boxes and rules; each set has 11 characters. You can also specify underline, bold, doublestrike, and so forth. Because *ClearCut* has no automatic centering feature or built-in editing ability, you must align the text and the fields manually.

You can import data or enter it manually from the data section. You can browse through the file, search for specific records, delete and update records, and sort your data on up to 512 fields. In addition, because deleted records are simply marked as deleted and not actually removed, you can also restore deleted records or purge them from the file if you begin to run out of disk space.

As with most file managers, running an operation and viewing the result are two separate steps. When querying, for example, you first define and execute the search criteria. If it finds a match, *ClearCut* marks it. You then browse the file for the marked records.

When a search fails, however, *ClearCut* simply does not mark any records. While this inaction implies a failed search, a "No records meet query criteria" type of message would be more helpful, especially if some records were still marked from a previous operation.

GOOD REPORT FACILITIES For a flat-file manager, *ClearCut* has some impressive report facilities. It supports headers, page breaks, and calculated fields so that you can produce such information as totals, counts, minimums, maximums, and averages. Generating a report requires creating a form and then linking the fields from the data file to those that appear on the report form.

Included on the distribution diskette is a separate utility that imports ASCII files and configures your printer so that it can print the graphics characters used in the reports. To import a file, you must define the source file and the database file. *ClearCut* delimits its fields with Tabs and its records with a carriage return.

ClearCut does have some limitations, but they tend to be common to many flat-file managers. You cannot, for example, view more than one record at a time without generating a report.

Also, because *ClearCut* does not differentiate between numeric and alphanumeric data, there's little, if any, automatic data checking. As a result, if you're not especially diligent during data entry, your file can contain text in what you might presume is a numeric field.

Despite these limitations, *ClearCut* is an excellent choice for anyone looking for a database in the low-end market. It is easy, simple, and well within anyone's budget. Best of all, you get all the functionality of the more popular *PFS/IBM Assistant* file programs in one package. In other words, you don't end up paying extra to get a report generator that the program should have had to start with.

—Vincent Puglia

PC MAGAZINE FACT FILE

***ClearCut*, Version 1.1**

Menlosoft/Business Day & Software

5 Cheryl Pl ; Menlo Park, CA 94205; (415) 326-7285

List Price: $49.95 **Requires:** 128K RAM, one disk drive, DOS 2.0 or later. **In Short:** Easy, inexpensive, and menu-driven, this database gives you all the functionality of the more popular, and more expensive, programs but in one impressive package. Not copy protected.

CIRCLE 678 ON READER SERVICE CARD

ClearCut's flexibility can be easily seen in its ability to create graphics around user-defined labels.

How many hours do you spend staring at your computer, waiting for your commands to finish?

QuickDOS

THE BLAZINGLY FAST HARD-DISK FILE MANAGER

The sheer speed of QuickDOS (Q-DOS) runs rings around the competition (just look at the comparison chart). QuickDOS was designed to manage the files on your hard disk better, faster, and easier than any other program available — and at the lowest price.

File Manager Comparisons	Quick-DOS	Path-Minder *	Xtree *	Window-DOS *	Direc-Tree *	Keep-Track + *	1dir *
Sort and redisplay 262 files (in memory) by name	.9 sec	25.6	2.1	6.6	65.4	4.6	2.6
Scan disk, display map of directories on drive C	7.6 sec	20.7	24.2	23.0	29.1	37.3	n/a
Same as above, but on a Bernoulli * drive	2.7 sec	9.1	12.6	12.9	14.6	15.5	n/a
Return to file mgr after running a program (1)	0.1 sec	24.0	24.2	n/a	2.8	.7	1.8
Copy 23 files from drive C to drive A (2)	34.0 sec	40.2	38.0	41.6	74.1	51.9	43.7
Start up program and find a file — maximum time (3)	12.3 sec	89.4	26.1	27.0	47.4	39.2	n/a
Show files on drive A, then return to drive C (1)	1.3 sec	40.3	25.5	12.4	5.5	39.2	7.1
Can be used to backup your hard disk?	YES	NO	NO	NO	NO	YES	NO
Intuitive on-line help in middle of commands?	YES	YES	NO	NO	NO	YES	NO
Is user manual available on the screen?	YES	NO	NO	NO	NO	NO	NO
Price	$29.95	$39.95	$49.95	$49.95	$49.95	$79.95	$95.00

(1) This shows the flexibility of the program; the time shown does not include the 2 or 3 second response time of user.
(2) PC-DOS 3.10 took 38.7 seconds
(3) Norton Utilities' "file find" program took 24.9 seconds

SPECIAL PRICE **$29.95**

QuickDOS is powerful, yet simple.

It instantly does what you want it to do, faster and easier than other DOS helpers. And QuickDOS does not confuse you with unnecessary commands. Other programs are slower, more expensive, and complicate things with "bells and whistles" which won't help you enough to justify their complexity.

QuickDOS is easy to learn.

There are several competitive programs that claim to help you, but most of them were designed with the very experienced user in mind. You have to be a professional programmer to understand them. If you select the wrong program, the "learning curve" could eat up all the extra time you thought you might save — *and even then, these other programs are much slower.*

QuickDOS helps you when you need help. And when do you need help most? When you are in the middle of a command! Our context-sensitive help system (over 75,000 bytes of help) will tell you everything you need to know about any command or feature of QuickDOS — you won't need to read the user's manual (we give you one, anyway) because it is displayed on the screen when you need it.

QuickDOS is a fully featured DOS helper.

You can copy, erase, rename, and move files without even typing a file name or directory path. You can make or remove directories, find misplaced files, and protect sensitive files. You can also backup your hard disk at the end of the day, copying only those files that have been modified since your last backup.

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Order by phone with VISA, MASTERCARD or COD.

System Requirements: IBM PC, XT, AT or compatible hard disk or two drives recommended. 256K memory, DOS 2.0 or Higher

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CIRCLE 486 ON READER SERVICE CARD

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We don't really expect you to trade your kids for Get!,™ our pop-up PC communications software. But several Fortune 500 companies told us it just might be worth it. They had thousands of people with access to electronic mail . . . several of whom checked their box regularly. Now they have Get!. Checking twice a day right on schedule. All by itself.

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THE DATAFILER

The DataFiler by MBS Software is a good, clean, functional database manager. While its file setup procedure is lengthy, you'll find it has enough useful tools to set up and maintain efficient databases.

You must go through a five-stage process to construct each new data file so that later functions will operate smoothly. You can't, for example, perform a sort or a search if you've skipped the "report format" setup procedure.

The DataFiler requests detailed information, from drive designation to remarks on the file's purpose and its buffer size. Worth remembering is that the first field is the default key field; you must choose your first entry carefully.

The program can describe fields as alphanumeric, integers, and single- and double-precision, which you use for figures with 6- and 16-digit decimals. Other screens let you specify keyboard, result (calculation), or constant data entries. For example, a commission percentage may be a constant field. Result field entries calculate numeric fields defined prior to the creation of the result field. You can also specify required fields.

The Screen Report option, an input screen with line and column count, helps you prepare reports. You decide the order in which you want the fields to appear. When you enter the two-digit field number, the field length automatically delineates a shaded box equal to the length of the field. You can also use screen reports to design form letters.

THE SELECT/SORT FUNCTION The select function allows the program to locate and retrieve sorted fields that meet your criteria. Select/sort specifications include field number, comparison/selection, an and/or operator, and match/replace. When using *The DataFiler* you should take time to experiment with different combinations of entries. The select function also updates and deletes fields.

One limitation is that if you are searching for an exact match of a field, such as records with a particular last-name field, you must enter the criteria with the same case treatment as the original field. This requirement can be cumbersome if you don't want to go back and check the correct combination. You can, however, enter the first two characters of a field entry to perform a broad sort or search.

Another inconvenience is that you can't easily scroll through the results of a search on-screen. The report reels by on the monitor, and although a "pause" key lets you stop the data, it offers little flexibility.

AUTOMATIC UPDATE Other utilities include an auto-update facility, which lets you update up to five fields with the same information simultaneously. You can also merge a *DataFiler* file with a *MultiMate* file to create form letters and mailing lists—a feature that adds significant power to *The DataFiler*, which on its own limits you to a total of ten reports and form letters at a time.

The program's on-screen help is good, and going back to earlier screens and menus is as easy as hitting Esc. The program uses F10 consistently to save entries of file specifications.

Despite its programming shortcuts that force you through a long setup procedure, *The DataFiler* can help you organize a neat set of records, perform efficient data searches, and create useful reports.

The DataFiler II, which will have more features, is due out late this summer.

—Virginia Dudek

PC MAGAZINE FACT FILE

***The DataFiler*, Version 1.1.1**
MBS Software
12729 N.E. Hassalo St.; Portland, OR 97230; (503) 256-0130
List Price: $79 **Requires:** 256K RAM, two disk drives, DOS 1.1 or later.
In Short: A solid program that can help you set up and maintain efficient databases. Its setup process is cumbersome, but the on-screen help is good. Not copy protected.
CIRCLE 691 ON READER SERVICE CARD

The DataFiler *lets you fill up to three screens with 15 data fields each per file.*

DBS/EXPERIENCE

DBS/Experience manages to pack a lot of power into a menu-driven program. But *DBS*'s method of working with multiple files may make it inadequate for some users.

DBS's dual menus are surprising at first, but they work well, from defining fields to putting together complex queries. You can type a digit to pick an item from the current menu or hit one of the function keys, whose actions are constant throughout most of the program. F1 brings up context-sensitive help. F2 shows a directory of *DBS* files. F7 usually lets you change what file you're working with—a real convenience. F9 brings you back to the master menu.

Even reasonably complex queries can be built up from the menus, including If

clauses and simple summary statistics. *DBS* will translate your choices into its simple query language. The query can then be run, edited, or stored for future use. Power users can skip the menus and enter a query "by hand."

SOPHISTICATED REPORTS A separate utility can create more-sophisticated reports. *DBS/Reporter* can produce headings and print summary statistics or start a new page when a field changes. It can't sort the data; it assumes that's been done, presumably by generating a sorted temporary file from *DBS*'s query facility.

DBS can handle information from more than one file at a time and would almost qualify as a Category 2 (relational) database, but there's a catch. The only way to deal with multiple files is to "join" up to ten files together into a new file, based on a common field. For example, I made the benchmark report by combining the Person and Salary files into a temporary file and then joining that with the Department file. The bad news is that if I changed any of my files and wanted an updated report using more than one of them, I'd have to rejoin them. *DBS* has no command files to reduce the tedium of doing this. If your data changes frequently, you'll have to tell *DBS* to rejoin the files each time you want to run a multifile report. If your time is valuable, you'll probably find this unacceptable.

A MENU-BASED SYSTEM Power is one thing; ease of use is another. For a menu-based system, that means you should always be able to tell which entry in the current menu will lead you to your goal. By that test, *DBS*'s menus are very well laid out.

The on-line help is context sensitive but weak on getting you out of trouble when you've made a mistake. Occasionally, it simply tells you to read the manual.

The manual itself could stand improvement. It's split between the "Interactive Evaluation System" manual (included with the $16.95 demonstation version) and the reference manual, which is really a terse tutorial. An advertisement for a previous version says the "135-page reference manual includes an extensive index and glossary." Version 3.0 has a 72-page manual without index or glossary (they'll reappear in a future version). And several features, notably the F7 Change Files command, simply aren't documented at all.

If you call Postley Software with a question on *DBS*, John Postley himself will help you. As with many small companies, if the one or two gurus aren't available, you may have to wait. I was usually able to get immediate, in-depth assistance on my first call.

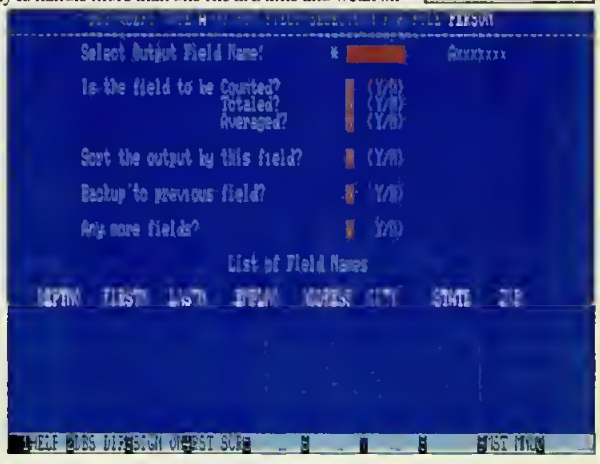
DBS is severely limited in its ability to process more than one file at a time. If joining several files is adequate for your needs, fine. If you're not sure, Postley Software has a $16.95 demonstration version available. The company also has site licenses for as few as four copies, and a micro-to-mainframe link is under development. For the current version, though, be prepared for an easy-to-use system that can handle multiple files, but just barely.

—J.H. Smith

PC MAGAZINE FACT FILE

***DBS/Experience*, Version 3.0**
Postley Software Inc
1015 Gayley Ave., #1000; Los Angeles, CA 90024; (213) 203-8008
List Price: $195 **Requires:** 128K RAM, two disk drives, DOS 2.0 or later.
In Short: An easy-to-use menu-driven database, *DBS/Experience* has a lot of power, but its limited ability to handle more than one file at a time and weak on-line help are drawbacks.
Not copy protected.

CIRCLE 683 ON READER SERVICE CARD



In DBS/Experience, *complicated queries can be built up, a piece at a time, from the menu.*

ELECTRIC DESK

Electric Desk from Alpha Software is a handsomely designed package that includes database, word processing, spreadsheet, and communications components. While it won't win any power-user prizes and its data input facilities are essentially primitive, the package offers easy integration and a straightforward, manageable database capable of handling simple alphanumeric database tasks.

The program comes packaged in a large portfolio containing three floppy disks and a novel-sized manual. Because it comes in two flavors—small memory (below 256K bytes) and large memory (above 320K)—*Electric Desk* can accommodate a range of memory configurations.

Electric Desk's screen design is attractive, and its extensive color options let you create schemes to charm any interior decorator. The bottom row of the screen displays a moving-bar command line to integrate the various *Electric Desk* services. Just above this "service line" is a dynamic menu system. The top of the screen displays nine function key commands that correspond to the selected submenu option. Despite the three-tiered command system, the workspace area is large and comfortable.

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Infoscope is a data handler that accepts and deals with data without complicated programming. It lets you file data without the artificial restrictions — such as length and number of fields per record — that slow you down on other programs.

Its "on-disk tutorial" helps you get acquainted through examples. Then, its "command/menu" system lets you progress at your own speed. Any time you need it, press a "choice" key and Infoscope will give you appropriate choices for the task at hand.

For the expert, Infoscope offers 40 function keys you can program to perform complex tasks with a single keystroke.

And because Infoscope stores your data in RAM, it responds much more quickly than other data base managers. Sorting time for 1000 records is 3 seconds — compared with times from 38 seconds to 5 minutes on popular integrated applications software.

Easy in, easy out

You can enter data into Infoscope in a variety of ways.

Directly, of course. Right off the keyboard, without a lot of formality.

But it also reads files from other programs such as dBase, 1-2-3, and Multiplan.

That means you can selectively enter a file from larger storage into Infoscope, where you can manipulate it and print it out much more quickly.

It shows its stuff

Whatever you want out of Infoscope, you can get — in color or monochrome, in any of as many as 14 expandable windows, or "Scopes."

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Infoscope requires minimum 192K RAM (256K recommended), DOS 2.x-supported hard disk or two double-sided floppy disks

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OPENING A SERVICE The program's "desk" motif is maintained throughout. "Opening a service" is akin to taking work out of your desk. You can open two services simultaneously, either creating two separate windows or toggling between services. If you plan to use your database for template document operations such as mail-merges and form letters, these features are terrific.

Electric Desk accepts ASCII comma-delimited files, but it would not accept my .SEQ comma-delimited file because it contained BASIC-style quotation marks separating each field as well. With a stand-alone database I might have been stymied, but, using *Electric Desk*'s word processor, I quickly edited out the quotation marks and imported a clean data file.

Creating a new database using *Electric Desk* is a free-form proposition. You paint the screen with field labels and then define each field's data type.

Data input is virtually unrestricted—a serious shortcoming. You are allowed three types of input classifications: labels, which identify the fields; data, which is the information itself; and comments, which are informative aids. You can define the data only as all data, numbers only, or forced uppercase. The program makes no provision for money, date, time, or integer formats. It cannot handle any calculated fields or range settings. Setting stringent field inputs is impossible.

Electric Desk makes you use the Space bar to set the correct number of spaces for a field. You cannot directly specify the length of a field. Furthermore, the only format restrictions you can specify are for normal, underlined, boldface, or reversed-video fields. You have fine control over trivialities but less over more-consequential points.

Electric Desk's "enter what you will" database philosophy makes the design phase easy. But it makes the onus to ensure impeccable data input especially heavy.

GOOD INDEXING AND SEARCHING OPERATIONS *Electric Desk* handles indexing and searching well. You can create up to five indexes on three fields but must specify all indexes at the onset. When you tell *Electric Desk* to create a new index, it erases all previous indexes. This means you must plan your initial indexing strategy well.

The program's search facilities are powerful, but slower than those for indexing. Search criteria are limited to seven relational symbols including equal to, greater than, less than, and their combinations. You can specify multiple search criteria by using AND/OR statements. A serious limitation is that the program cannot sort.

Electric Desk's report facilities are primitive; it has no math or special functions. In fact, the standalone database has no true reporting features. You can use the word processing component, however, to merge the appropriate database fields with a document template, creating some impressive reports.

The database includes a telephone dialing option that works with any phone number listed in the database.

If you use databases to create form letters, mailing labels, and template documents, you'll enjoy *Electric Desk*'s integration. If you require a more rigidly defined database with the ability to link files, perform operations on the fields, and sort data, you'll find *Electric Desk* lacking a few kilowatts of power.—**Robin Raskin**

PC MAGAZINE FACT FILE

***Electric Desk*, Version 1.1**
Alpha Software Corp.
30 B St.; Burlington, MA 01803; (617) 229-2924; (617) 229-2915 (bulletin board)
List Price: $345 **Requires:** 256K RAM, one disk drive, DOS 2.0 or later.
In Short: An integrated package that includes word processing, spreadsheet, and communications components as well as simple, straightforward—albeit limited—database management. Not copy protected.
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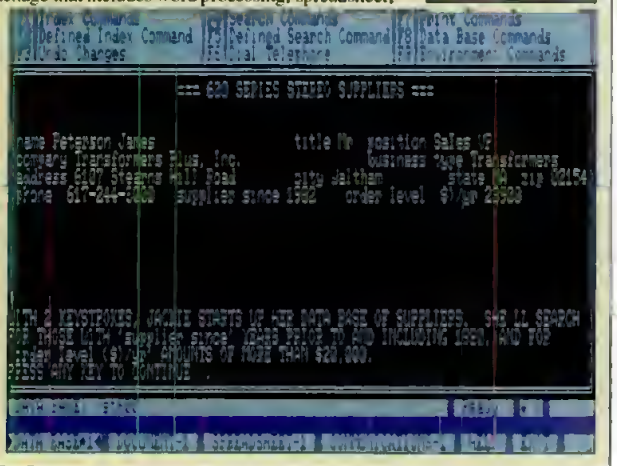

Electric Desk's *tutorial guides you through the creation of an indexed database.*

EXECUTIVE CARD MANAGER

If you wax nostalgic for the good ol' days of the Rolodex but demand modern electronic ease and efficiency, you'll appreciate Hewlett-Packard's *Executive Card Manager*. The program combines the visual simplicity of a card file system with sophisticated information management features. Although it's limited to working with single files and is decidedly text oriented (as opposed to numeric or formulaic), *Executive Card Manager* is a fine, simple database management system.

The program's screen is a graphic replica of the familiar rotary card file. You design a blank card file form and key in the card's information. The screen graphics include identifying index tabs on each record and "turning knobs" that allow you to scroll or flip through the card file. Pressing F10 opens a record for inspection. Unlike its paper ancestor, a single *Electronic Card Manager* file card record is expandable to as many as 11 pages. Dynamic

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*Typing Tutor III ..... 33.

EDUCATIONAL

Barron's

*Computer SAT ..... 35.

Designware *(requires graphics board)*

*Spellicopter *(ages 6 to adult)* ..... 22.
*Grammar Examiner *(ages 9 to adult)* ... 25.

Eduware *(requires graphics board)*

*Algebra 1, 2, 3, or 4 ..... 22.

Harcourt Brace Jovanovich

*Computer SAT ..... 49.
*Computer GRE 55

Stone *(requires graphics board)*

*My Letters,Numbers,Words *(ages 1 to 5)* 29.
*Kids Stuff *(ages 3 to 8)* 29
*Algebra+ *(grades 7-12)* ..... 32.

The Learning Company *(requires graphics board)*

*Reeder Rabbit *(ages 5 to 7)* ..... 26.
*Rocky's Boots *(ages 9 and up)* ..... 32.

RECREATIONAL

Blue Chip *High finance simulations.*

*Baron ..... 32.
*Millioneire 32

Electronic Arts *(requires graphics board)*

*Pinball Construction Set 24
*Music Construction Set ..... 26.
*Dr. J/Larry Bird One-on-One ..... 28.

Friendlysoft

*PC Arcade 35

Hayden Software *(requires graphics board)*

*Sargon III *(highest rated Chess program)* 32

Infocom *Difficulty levels shown in italics*

JUNIOR

*Seastalker ..... 25.

STANDARD

*Enchanter *the Witness *Planetfall
*Cutthroat *Wishbringer *Zork I
*Ballyhoo *Fooblitzky
*Hitchhiker's Guide ..... each 24.

ADVANCED

*Zork II *Zork III *Sorcerer
*A Mind Forever Voyaging ..... each 27.

EXPERT

*Spellbreaker *Suspended ..... each 29.

Invisiclues (hint booklets) are available for most Infocom games. Specify game ... 6.

Microleague Sports *(requires graphics board)*

*Microleague Baseball ..... 25.

Microprose *(requires graphics board)*

*F-15 Strike Eagle ..... 22.

Microsoft *(requires graphics board)*

*Flight Simuletor 2.12 ..... 32.

1Step Software *(requires graphics board)*

*Golf's Best *(Pinehurst)* 32
*Golf's Best *(St. Andrew's)* 32

Parlor Software

*Bndge Parlor *(best Bridge simulation)* ... 49

PCSoftware

*Championship Blackjack ..... 25.

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*King's Quest II ..... 33.

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Spectrum Holobyte *(requires graphics board)*

*GATO ..... 27.
*Tellstar *(w/Halley's Comet)* ..... 32.

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*Night Mission Pinball ..... $29.
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System Stand ..... 19.
*Universal System Stand ..... 25.
*Low Profile Tilt and Swivel Pedestal 25
Crystal 300-watt *(line conditioner)* ..... 159.

CABLES

*Smertmodem to IBM Cable 17
Keyboard Extension Cable *(3 to 9 feet)* 27
Extension Cebles for IBM Mono Display 33.
Color and Monochrome Extension cables 39
*Printer-to-IBM cable ..... 17.

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*Emerald *(6 outlets; 6 ft cord)* ..... 36.
*Sapphire *(3 outlets; EMI/RFI filtered)* .... 47.
*Ruby *(6 outlets; EMI/RFI filtered; 6 ft cord)* 55.
*Command Center ..... 99.

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Irma 769

Epson *(1 year)*

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*Smartmodem 2400 ... 579.
Smartmodem 2400B *(w/Smartcom II)* ... 539.
Smartcom II 2.1 *(software)* ... 75.
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function key prompts appear along the bottom line of the display to prompt you through menu selections, and you select fields by using the cursor keys.

As you "paint" the card files' field titles on-screen with the cursor, the prompt line ticks off rows and columns. Adding pages to a form is as simple as redrawing the bottom line of the file card. You specify the desired data-field length by typing backslashes that represent the appropriate number of characters. I'd prefer typing in a numeric field-length identifier, but the inconvenience is minor.

Indexing is a simple matter of selecting a field and choosing the Set/Clear Key Field on the menu. You may index three key fields at one time, and each recalled index rearranges the graphic index tab on the Rolodex.

SEARCHING CAPABILITIES Searching capabilities are easy to use but not exceptionally powerful. In addition to partial- and full-word searches of key fields, the program allows simple Boolean (greater than, less than, equal to, and Not) searches on numeric fields. During a search, temporary files of the search results are created and subsequently destroyed unless you specify that they be saved. Searches within a search (salaries within a department, for example) require two consecutive searches. Similarly, you can widen a search (all employees who live in the Northwest, for example) by conducting consecutive searches, marking the applicable records, and combining them into a workset. This narrowing and widening process is an effective and logical way to organize searches on specific but related fields. You can also mark certain cards in your file (for example, all the clients you contacted today) and use them to search, retrieve, and print.

The program's report generation features are adequate but nothing special. You can design a report (columnar) or label format, and data field manipulations include sum, count, and average.

Executive Card Manager is the ideal (albeit expensive) address book because of its telephone-dialing capabilities. If you have a modem, the program will dial any telephone number stored in your database. It can store up to eight frequently dialed phone numbers as macros.

Here's a unique twist: installing the product on a hard disk is easy. Floppy disk users unused to pathnames may be confused, however, because the floppy disk setup and the floppy naming conventions use pathnames and directories. While keyboard input is certainly adequate, the program performs better with a mouse, and it was designed to take advantage of the HP touch-sensitive screen (specifically that of the HP Vectra).

Executive Card Manager can be run in either the DOS or PAM (standing for Hewlett-Packard's Personal Applications Manager) environment.

GLAMOROUS DATABASE *Executive Card Manager* is a simple database (à la *PFS: FILE*) made glamorous. The highly graphic interface is pretty, but it also chews up memory and slows down benchmark times. The documentation borders on overkill—slickly produced, artistic, and voluminous. Hewlett-Packard's efforts should be commended, but the information contained in the documentation should be consolidated.

An add-on package, *Executive Card Manager Templates*, which sells for $125, gives you over 20 ready-to-use forms. The forms are attractive and practical, but working with *Executive Card Manager* itself should be easy enough so that you can avoid the additional expense.

I, for one, adore glamorous software. So if you share my sentiments and also find the file card analogy to databases helpful, *Executive Card Manager* may be just the thing to keep your deck straight.
—Robin Raskin

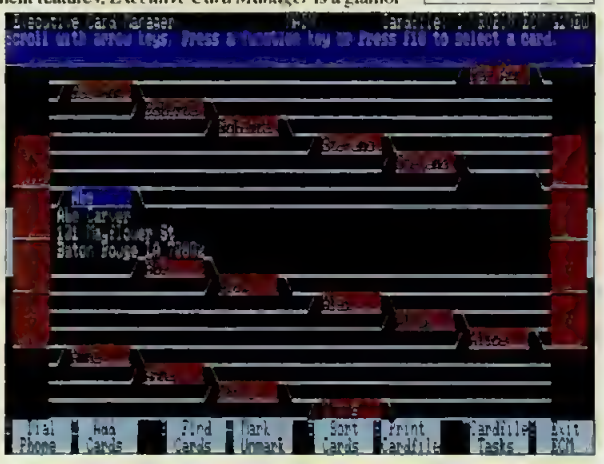
PC MAGAZINE FACT FILE

Executive Card Manager

HEWLETT PACKARD

***Executive Card Manager*, Version A. 01.04**
Hewlett-Packard Personal Software
3410 Central Expy.; Santa Clara, CA 95051; (800) FOUR-HPC
List Price: $295 **Requires:** 128K RAM, one disk drive, DOS 2.1 or later.
In Short: Combining the visual simplicity of a card file system with sophisticated information management features, *Executive Card Manager* is a glamorous text-oriented file manager; it's also the ideal address book because of its telephone-dialing capabilities. Not copy protected.

CIRCLE **609** ON READER SERVICE CARD



Using a rotary card file graphic analogy, Executive Card Manager *lets you open an indexed file and view a complete record.*

FASTFILE

The Datamate Company chose an appropriate name for its database manager. *Fastfile* is just that—a relatively quick, no frills, menu-driven data-filing system with a few extra features to do the usual type of data manipulation. *Fastfile* is not sophisticated, but it gets the job done without too many hassles. After completing the tutorial, which introduces you to almost all *Fastfile*'s features and examples of uses, you'll be well on your way to using the program without too much confusion.

OUR REVIEWERS

Testing this many database programs took a lot of people power. Fourteen highly qualified reviewers handled the testing and reviewing chores for this special report.

Eric Bank is an independent computer consultant based in New York.

Carol Olsen Day has written about how to master the PC repairs market ("The PC Repairs Game," Volume 5 Number 8), as well as how to maintain your PC's health ("A Dollop of Prevention, a Pinch of Repair," Volume 5 Number 11) for *PC Magazine* this year. Her most recent book is *The New Immigrants* (Franklin Watts, 1985), which she coauthored with her husband, actor/writer Edmund Day. She is also an expert on job-winning and career strategies, having produced and written five books on that topic for publishers such as Simon & Schuster and a monthly column for *Family Circle*. Currently, she also writes for television.

Joe Desposito was formerly a technical editor at *Computers & Electronics* and *Creative Computing*. He is now a free-lance writer specializing in computer software and hardware.

Virginia Dudek is a former assistant editor at *PC Magazine*. She is now a free-lance writer in New York.

David Hoffman is a microcomputer consultant specializing in database and graphics applications. He has trained groups in the use of popular business software and designs custom database systems. He has been a member of the board of directors of the NYPC Users' Group for several years. He coproduced a cable TV series on computers, which included interviews with such notables as Peter Norton, Bob Frankston, and Steve Wozniak.

Jane Mintzer is a free-lance writer based in New York. She is a former assistant editor at *PC Magazine*.

Dara Pearlman is a free-lance writer based in California and contributes frequently to *PC Magazine* on various topics. She also writes for local newspapers and other computer magazines.

Vincent Puglia writes frequently for *PC Magazine*. He has written for *Changing Times*, *Video*, and numerous computer-related newsletters and has edited books for the New York City Board of Education.

Robin Raskin is a New York-based free-lance technical writer and frequent contributor to *PC Magazine* who specializes in educational and family-computing issues. She writes for a number of computer publications and teaches technical writing at Baruch College.

J.H. Smith is a systems programmer for a large company in the personal computer industry.

Stephanie Stallings is a former associate editor of *PC Magazine*.

Paul M. Stafford is an assistant editor at *PC Magazine*. He is in charge of the New on the Market section of the magazine.

Nancy Trespasz is a microcomputer sales consultant at McGraw-Hill. A graduate of Lehigh University, she keeps herself up to date on computers by taking courses at New York University's Information Technologies Institute.

Phil Wiswell is a free-lance writer based in New York. He has written frequently for *PC Magazine*. He also has his own computer-consultant business.

CREATING A DATABASE Creating a database is straightforward with *Fastfile*. To define a maximum of 50 data fields, you answer up to 12 questions, depending on the type of field. The "key field," or the first field, has its own rules and unique specifications. Likewise, this field is the only one that you can't modify without starting from scratch once the database is created; so be careful to choose a unique data item for your key field. If you need to modify, add, delete, or inquire into any of the other data fields, you have to first unload the data into a sequential file (a file where the records are positioned one after another), then make your changes using the options from the "setup database" menu. You must write a BASIC program to take ASCII-format data from another application and import and export the data to a sequential file so that it is in a format that *Fastfile* can read.

As you are creating your data fields, *Fastfile* automatically builds a screen layout design. At this time, if you have a particular design requirement, you can design the layout by indicating the line and position number on the screen where you want each field to appear.

Now you get to the first really odd feature of the program. Before you can begin entering data into your database, *Fastfile* requires you to print your database dictionary with the descriptions of your newly created data fields. Presumably this is so you can have a handy copy of the names and descriptions of your data fields for easy reference. However, if you are able to remember this information for yourself, you won't want *Fastfile* acting like a mother hen and insisting that you remember this information *her* way. Every time you make any change to the structure of your database, you must, once again, print a new copy of the revised dictionary.

THE ENQUERY REPORT WRITER *Fastfile* won't manipulate the data in any way until you've entered its report generation mode, called EnQuery. As a result, to do anything with your data, you have to set up a report, type in the EnQuery commands, and then run the report. EnQuery accepts English-language commands to perform different functions; then you must run a report (either by printing it or displaying it) to see the results. EnQuery saves up to 28 reports per file and automatically lists and saves your newly created report as the number-one report on the EnQuery main menu. This is a sloppy feature of the program, because if you already have a report in the number-one slot, as you will if you've created at least one other report, you must remember to move it to another number or it will be lost when EnQuery replaces it with the current report.

The English commands needed to set up your report are listed on the bottom of the report setup screen. You have to type in all the commands that tell *Fastfile* what you want to do (these are called "report specifications" or "report parameters") and then go the the EnQuery menu to de-

cide what you want to do with this report. So, if you want to print an alphabetical list of all your employees and their salaries, you type SORT BY LAST NAME PRINT LAST NAME SALARY END. Now you return to the main menu and choose Run to execute the report.

Some of EnQuery's other features include counting and comparing field entries using Boolean logic, and doing calculations such as four-function arithmetic and percentages. One important feature missing from *Fastfile* is a search function. However, if you do know exactly what you are looking for, you can sort that field and use EnQuery's Start/Stop command to read the file and produce only the records that fall between the starting and the ending values you have chosen.

Fastfile serves its function as a limited, uncomplicated file manager. Besides a search feature, I would have liked other handy functions, such as a two-level sort, the ability to create a permanent index, and color capabilities. Despite its shortcomings, *Fastfile*'s recently dropped price of $49.95 may make it a viable choice if you're looking for a simple file manager.—**Jane Mintzer**

FILEBASE

Filebase, from EWDP Software Inc., is more than just a simple yet powerful database manager—it's a file-processing system and a utility for letter-merging programs like *MultiMate*, *DisplayWrite III*, and *WordStar/MailMerge*. With a little polishing up of the manual and the look of the program on the screen, *Filebase* could be a very impressive tool.

No installation is required. *Filebase* has one main menu with 11 options for you to choose from. Hitting the Question mark (?) key almost anywhere in the program brings you back to this menu.

You then easily initiate any of *Filebase*'s functions by entering the number of the option you want to perform and following the on-line prompts. Answering a straightforward yet seemingly endless array of questions is a trade-off for not having to learn a lot of commands.

CREATING AND CONVERTING FILES Creating a database file is a cinch with *Filebase*. The files consist of comma-delimited field records, and the program generates variable-length records; so there is no need to predetermine the size or the nature of each field. You tell the program how many fields you need and then name each field, or you use a previously stored prompt file with field names and then go ahead and enter the data.

Because *Filebase*'s fields are variable length, entering or changing data that varies in length from record to record is no problem. *Filebase* can also add new fields to existing records or move around fields to restructure files. From the main menu you can convert a file to fixed-length records, but the fields will always remain variable length. This one-time conversion permits you to create in-RAM indexes.

■ Creating a database with *Filebase* is a cinch. With some polishing up of its manual, the program could be a very impressive tool.

Many of *Filebase*'s operations result in the creation of new files with new fields resulting from field calculations or totals. A handy and precautionary feature of *Filebase* is that it never alters the original file you are working on, but rather, you must generate a new output file. This feature is also useful if you want to generate different reports for the same file.

With *Filebase* you can often access two files at the same time—a particularly useful feature when you're using the program as a letter-merging utility. You can also merge two files provided they both have the same field structure.

FAST SORTING *Filebase* has quick and impressive sorting capabilities. You can sort on a numeric or character basis in ascending or descending order. Two files can be sorted at once, and you can use the Include/Exclude function to search for and extract records (either by field or by record

PC MAGAZINE FACT FILE

FASTFILE
Tutorial
AND
Reference Manual

***Fastfile*, Version 3.2**
Datamate Company
4135 S. 100th East Ave., #128; Tulsa, OK 74146; (800) 262-7276; (918) 664-7276
List Price: $49.95 **Requires:** 224K RAM, two disk drives, DOS 2.0 or later. **In Short:** An unsophisticated but fairly quick, no-frills, menu-driven data-filing system with a few extra features to do the usual type of data manipulation. Not copy protected.

CIRCLE 690 ON READER SERVICE CARD

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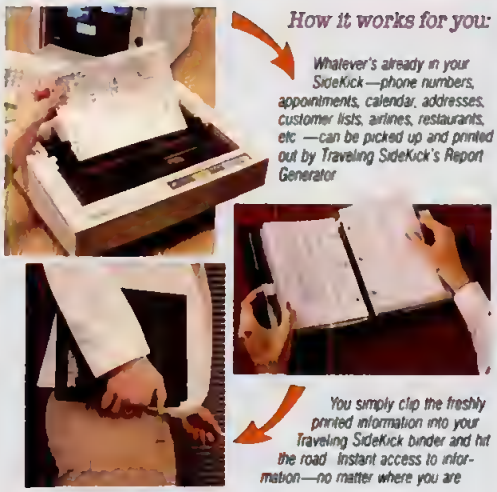
An electronic leap ahead of traditional diaries, day-timers and organizers, Traveling SideKick is BinderWare™ that includes a software program, a report generator, reference materials, maps, addresses, appointments, telephone numbers, calendars, customer lists, travel itineraries, a calculator, and much much more.

You need Traveling SideKick because it is the new Computer Age way to take all your facts, files and figures with you wherever you go—whether you're taking work home or heading out across America and the world.



How it works for you:

Whatever's already in your SideKick—phone numbers, appointments, calendar, addresses, customer lists, airlines, restaurants, etc.—can be picked up and printed out by Traveling SideKick's Report Generator

You simply clip the freshly printed information into your Traveling SideKick binder and hit the road. Instant access to information—no matter where you are

Naturally, you can add new information/files/data to your SideKick as it occurs. Traveling SideKick instantly incorporates all changes and updates. Traveling SideKick will also sort your address files by name, zip code, or company name. It prints mailing labels and other information selectively, and will search your files for existing addresses and appointments.

Traveling SideKick is your SideKick's® sidekick

More than half a million of you already know how indispensable SideKick, the RAM-resident desktop manager, is on your IBM® PC. (So do many Macintosh™ owners who are now using our SideKick/Mac version). While SideKick enjoys the rank of #1 best seller for the IBM PC, it can only go where your computer goes—so if your computer stays in your office or den, so does SideKick. Traveling SideKick changes all that.

For a limited time, Traveling SideKick is only $69.95

Until September 1, 1986, you can get Traveling SideKick for just $69.95—which is tremendous short-term and long-term value. Short-term because it solves immediate problems at a very low price, and long-term because Traveling SideKick works this year, next year, and all the "next years" after that. (Unlike old-fashioned daytime organizers, electronic organizers and calendars aren't obsolete at the end of the year.)

What's inside your Traveling Sidekick

Special Offer: Get both SideKick and Traveling SideKick for only $125.00

You probably already have SideKick, but in case you don't, we're offering you *both* SideKick and Traveling SideKick for only $125.00. (SideKick alone is usually $84.95. Add that to Traveling SideKick's $69.95, and you're looking at $154.90—which you don't have to look at, because you get $29.90 off when you buy both.) Whichever way you buy, you're getting our 60-day money-back guarantee** and making a highly organized and productive step into modern business life.

Traveling SideKick is an organizer, a binder, a software program and a report generator that picks your SideKick's brain, then prints out your appointments, daily, weekly, monthly, or yearly calendar, your phone lists, and mailing labels, itinerary, or whatever else you need.

YES! I want the best

Rush me Traveling SideKick at:

$69.95*

***Or both Traveling SideKick & SideKick at $125.00 ***

To order by phone, or for a dealer near you,

call (800) 255-8008

in CA call (800) 742-1133

Send me ____ Traveling SideKick(s) at $ ____

Send me ____ of both SideKicks at $ ____

Outside USA add $10 per copy

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Amount enclosed $ ____

Prices include shipping to all U.S. cities

Payment VISA MC Bank Draft Check

Credit card expiration date ____/____

Card #

You must have an IBM or true compatible running DOS 2.0 or later †

My computer's name and model is

The disk size I use is: ☐ 3½" ☐ 5¼"

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****60-DAY MONEY-BACK GUARANTEE**

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State Zip

Telephone

CODs and purchase orders WILL NOT be accepted by Borland. Outside USA make payment by credit card or International Postal Money Order.

**Special introductory Offer until September 1, 1986.*

***YES, if within 60 days of purchase this product does not perform in accordance with our claims, please call our customer service department and we will gladly arrange a refund.*

† ***Minimum System Requirements:*** *256K IBM PC, AT, XT, PCjr and true compatibles.*

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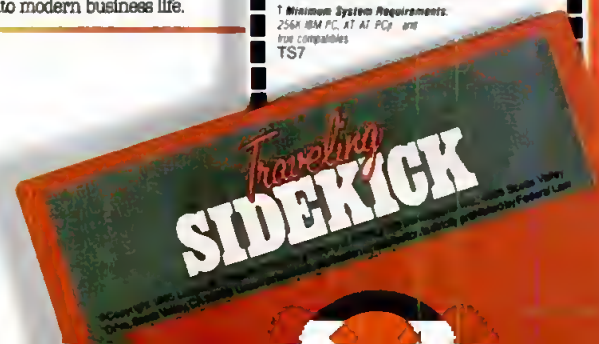

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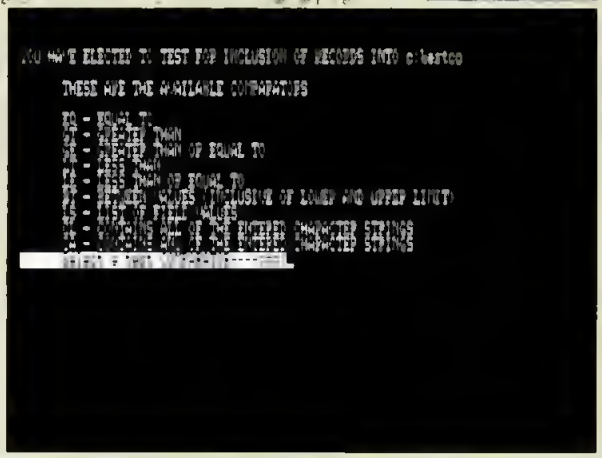
CIRCLE 142 ON READER SERVICE CARD

■ FLAT-FILE DATABASES

FACT FILE

***Filebase*, Version 5.7**
EWDP Software Inc.
P.O. Box 40283; Indianapolis, IN 46240; (317) 872-8799
List Price: $125 **Requires:** 128K RAM, two disk drives, DOS 1.1 or later.
In Short: In addition to being a powerful yet practical database manager, this program is a file-processing system and a utility for letter-merging programs like *MultiMate*, *DisplayWrite III*, and *WordStar/MailMerge*. Not copy protected.

CIRCLE 604 ON READER SERVICE CARD



Using the sort-and-select option from Filebase's *main menu, you can sort up to two files at once and select records on the basis of a variety of comparators.*

number) that meet your specific criteria. By choosing from an ample list of comparators like "equal to," "greater or less than," or "between two values," you can extract certain records and generate new files for them. *Filebase* is also sophisticated enough to sort on last names embedded in full names, ZIP codes embedded in addresses, and dates as part of the MM/DD/YY format.

Filebase's report capabilities are, again, straightforward. No programming is required, but you have to specify how wide the print fields should be. Calculations and running totals of fields are available, and the reports can be displayed on-screen or printed. You can also design labels and envelope formats with *Filebase*.

Filebase is not an index-based database, but EWDP Software has just released a data retrieval system called *FB/ACCESS* for new releases of *Filebase*. To use *FB/ACCESS*, you convert your file to a fixed-record-length format using *Filebase*; then *FB/ACCESS* provides a faster way to search for individual records using a key value.

Filebase is relatively easy and enjoyable to use. For $125, it's a practical program that could be used for a multitude of purposes. If only EWDP Software would rewrite the manual and add wider margins so that it doesn't look like the fine print of used-car agreements, it would really improve its already quick and versatile database and file manager.—**Jane Mintzer**

FILE EXPRESS

Express is the key word in this shareware database manager. *File Express* from Expressware performs like a blue-ribbon Thoroughbred racehorse. It's lightning fast, it's smooth and clear, and it's pretty to look at. It has most of the features to make it a winner, and it rarely disappoints you.

As is standard procedure with most shareware programs, you're on your honor to send in $40 for the program, a bound manual, notification of frequent updates, and user support. For $10 you can get a production copy of the program and an on-disk manual; then it's up to you to send in the $40 to become a registered user.

File Express is a colorful program with uncluttered screens, but if you're not interested in pretty colors, you can easily turn them off. The program makes a "blip"—a short, video-game—like beep—that you can also toggle off if you find the noise bothersome.

Completely menu-driven, *File Express* also provides easy-to-follow prompts and questions to answer. Nine options are accessible from the creatively designed main menu, and each option has a full submenu for more-specific tasks.

EVERYTHING'S A SNAP As with all *File Express* features, creating a database is a snap. You simply name up to 40 fields, define the type of data you'll be entering into the field (the symbols are always displayed on the bottom of the screen), and how many characters it should be. Entering data into a file is also a cinch. *File Express* provides for automatic data entry of time and date (assuming you've set this up correctly in DOS), and it also has calculated fields for totals and subtotals.

File Express has an efficient Search/Update option that lets you search for a record or string of records and then lets you replace, delete, update, or just look at your data. Using the Quick Scan feature of this option, you can examine the whole file or part of a file on eight fields. A handy feature of *File Express* is that you can always look at your file while using any option without having to go into the report-generating facility.

I was amazed at how quickly *File Express* sorted the PC Magazine Labs testing file. Unfortunately, *File Express* doesn't have an indexing capability, but the program sorted so quickly that it almost makes up for this limitation.

TWO REPORT TYPES With *File Express* you can create two types of reports: the standard columnar report and a line report, where each record is on more than one line. To create a report, you simply tell the program the order you want the fields to appear in, then choose automatic spacing (one space between fields) or manual spacing (you tell the program how many spaces you want between each field or record). These reports can be printed, displayed on-screen, or saved to disk. There is also a special mailing-label format that is easy to use. *File Express* displays a label-

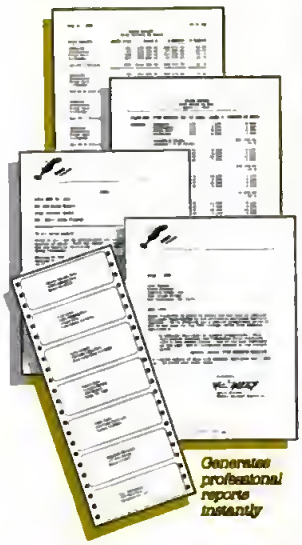
Using Lotus 1-2-3 without Reflex is like driving at night without lights

If you use Lotus 1-2-3® you need Reflex, The Analyst,™ because it shows you what 1-2-3 either hides in the dark or can't show you at all. Reflex shows you relationships and interrelationships in your data that you can't afford to miss.

Reflex includes the best Report Generator for Lotus 1-2-3

Reflex includes the Report Generator that 1-2-3 should have included—but didn't. With Reflex, you can generate reports, graphs, charts and diagrams *from* your 1-2-3 worksheets that are impossible to generate *with* 1-2-3.

You can do sales reports, letters, memos, invoices and mailing labels—to name a few—and you can see a few of them on this page.



Generates professional reports instantly

Reflex is the best database for 1-2-3 users and it's also the easiest to use

Reflex is the first database that separates the trees from the forest. The first database that understands that what you see depends on how you look at it.

The first database that probes relationships, then shows them to you in various graphic forms: scatter, line, bar, stacked bar and pie charts. The first database to break the bonds of traditional database management and give a dramatic visual turn to data analysis.

Reflex makes graphic leaps far beyond 1-2-3. With Reflex, when you look, you see.

Reflex gives you five new and different views of what's hidden in your 1-2-3 worksheets

Form View, List View, Graph View, CrossTab and Report View.

Form View lets you create your database. List View shows you your data in tabular list form, just like a spreadsheet. Graph View gives you instant interactive graphic representations. CrossTab View gives you amazing "cross-referenced" pictures of the links and relationships hidden in your data. Report View allows you to use information from 1-2-3, and then print out reports in all sorts of different formats.

The commands for all five Views are consistent—so you're not stuck learning five different ways to get something done. And because Reflex uses advanced windowing techniques, you can see several views on the screen at the same time—without having to switch back and forth. You get the picture, and the pictures, all at once.

Whether you're a 1-2-3 user or not, Reflex answers all your "What Ifs?" and leads you to the right conclusions

With Reflex when you modify a number all your Views—List, Form and Graph—are immediately updated, on-screen.

Let's say you're analyzing "Traveling Expenses by Salesperson" and you ask, "What if they stayed at a Motel 5¼ instead of the Presidential Suite of the Hotel Chic?" "Show me." So Reflex shows you.

"What if they could no longer order $100 wines, but had to stick to the stuff that matures in the truck?" "Show me." So Reflex shows you. Instant answers. Instant pictures. Instant analysis. Instant understanding.

Of course Reflex can do all of the above with or without 1-2-3. Reflex is a *complete* database management and analysis tool that stands on its own feet, and helps you stay on yours, because it's only $149.95!

Borland's $149.95 Reflex could be the best business investment you'll ever make

Buying 1-2-3 was a good idea. Reflex is an even better idea, because now you can see what you're doing, what you've done, and what you need to do.

Think of Reflex as an "automatic product," a "standard" that every up-to-speed PC owner should have on hand. It's only $149.95, and you get our 60-day money-back guarantee.**

We don't believe in copy-protection, but we do believe in quality, performance, and reasonable software prices. So keep driving your old 1-2-3, but get Reflex today, because then you can see where you're going.

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CIRCLE 147 ON READER SERVICE CARD

"Everyone agrees that Reflex is the best-looking database they've ever seen

Adam B. Green, InfoWorld

The next generation of software has officially arrived

Peter Norton, PC Week"

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___ Reflex(s) at $149.95 $ ____

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This price includes shipping to all U.S. cities

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You must have an IBM or true compatible running DOS 2.0 or later.*
My computer's name and model is:

The disk size I use is: ☐ 3½" ☐ 5¼"

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**YES, if within 60 days of purchase this product does not perform in accordance with our claims, call our customer service department and we will gladly arrange a refund.

Minimum System Requirements.
384K, runs on IBM PC, XT, AT, PCjr and true compatibles

shaped box in the top-left corner of the screen to aide you as you design your label. All report formats can be stored for future use. You always have the option of generating reports for the whole file or any part of the file.

DOCUMENTATION No tutorial comes with *File Express*, but the program is so easy to use that it almost doesn't matter. The documentation I used was easy to follow, though not as nicely polished as the program itself. I got a preview of the new documentation that Expressware is sending out with Version 4.0 of *File Express*, however, and I was very impressed with it. Expressware says that this updated version includes many other enhancements, including automatic incrementing of fields and the ability to access files from different directories.

File Express will certainly meet the needs of someone maintaining small- or medium-size databases. The program has no glaring deficiencies, and it boasts time-saving features, like the ability to reassign the function keys. All software should be this easy and pleasant to use.

—Jane Mintzer

FILEPLAN

There's something to be said for a manufacturer that goes to great lengths to customize its program for a very specific application. Chang Laboratories has tried to do this with *FilePlan*, its sales and client management database program. While it's form-letter and mailing-label capabilities work well for this use, I found the database to be too cumbersome and too inflexible to be a really effective organizing and filing tool.

First impressions can be everlasting, and my first impressions of *FilePlan* were not exactly stellar. *FilePlan* uses spreadsheet terminology; a file is called a worksheet, a record is a row, a field is a column, and so forth. The tutorial uses sample files to illustrate the program's features but doesn't clearly take you through the steps you'd have to do when working from scratch on your own files.

LIMITED DOCUMENTATION The documentation has similar limitations. It goes through each command giving a brief description of what the command does along with some questionably helpful usage tips. The documentation would be more effective if it clearly outlined all the necessary steps to complete each command and then had a separate section with sample applications and helpful tips.

FilePlan's main menu lists 22 numbered commands, grouped together by related functions. You'll notice some numbers are missing so that Chang Labs can easily update and add new functions to *FilePlan*. After choosing the desired command, you follow the prompts on the top left-hand side of the screen. There's always a greater-than (>) sign where you enter your data and a descriptive prompt below it to guide you. When you hit the Return key, the information is put in its appropriate place. One of *FilePlan*'s best features is that you can sometimes customize these prompts yourself.

Setting up a worksheet is excessively time consuming and cumbersome. First you must create an empty worksheet that's already equipped with only five fields. Then you enter a few bytes of data to establish this as a working worksheet, then hit Esc, which always takes you back to the main menu. From here you use the command to define your fields. Then it's back to the main menu to enter your data and again to name your worksheet. This process is archaic and not very smooth.

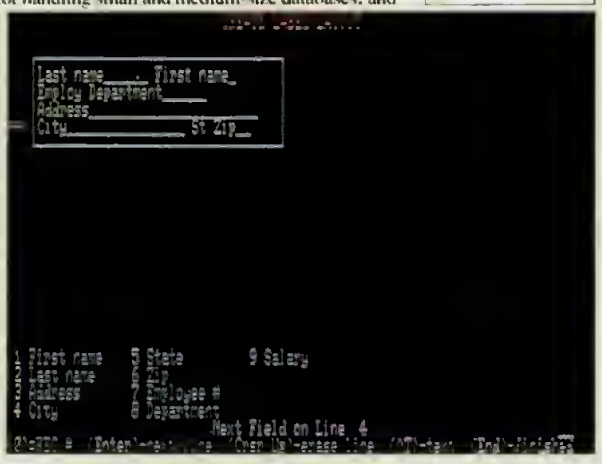
CUSTOMIZED PROMPT LINES Since *FilePlan* is not an inherently helpful program, it's here that you have the chance to help yourself. As you're defining your field formats, there's a column for customizing what you want each prompt line to say. You can also specify minimum and maximum range checks for numeric fields and assign codes or abbreviations for commonly used words or phrases. For example, if you've created a "Status" field, you can customize your prompt to say "Enter the appropriate letter that reflects the status of this account." Then in parentheses you designate A=active file or I=inactive file. When you get the prompt for this field, you simply enter A or I for active or inactive, and *FilePlan* will automatically enter the full description.

FilePlan's report-writing capabilities are as frustrating as its procedures for setting up a worksheet. The Print Worksheet

PC MAGAZINE FACT FILE

***File Express*, Version 3.60**
Expressware
P.O. Box 230; Redmond, WA 98073; (206) 481-3040
List Price: $40.00 **Requires:** 192K RAM, one disk drive, DOS 2.1 or later. **In Short:** Easy to use and fast, this attractive database manager has some timesaving features for handling small and medium-size databases, and since it's shareware, it's easy on the budget as well. Not copy protected.

CIRCLE 610 ON READER SERVICE CARD



When designing a mailing label with File Express, *you see a sample label format at the top of the screen. Then you enter the desired field numbers on the correct line and choose either automatic or manual spacing.*

Because you need the right word, the right phrase, the right meaning, and the right answer, *right now*, you need Borland's Turbo Lightning

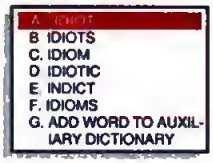
Since you write, think, work, live, breathe, and ask questions, you need the instant electronic support of Turbo Lightning™—the fastest, most amazing information system since your brain.

You need the power of an astonishing program that checks your spelling *as you type*. The versatility of a program that gives you instant access to the 50,000-word Random House® Thesaurus and the 80,000-word Random House Concise Dictionary. The retentiveness of a program that remembers your name and any other words you teach it. The adaptability of a program that lets you do all of the above—while you run other programs. And of course the growth path of a program that is rapidly developing into a body of fully-fledged electronic reference works called the Turbo Lightning Library.™

Turbo Lightning checks your spelling as you type and while you run other programs

You could be running Lotus 1-2-3,® MultiMate,™ MicroStar,™ Reflex,™ SideKick,® WordStar,® or WhatEver,® it doesn't matter which one, because as you write, Turbo Lightning watches how you spell every word, and is ready to alert you to any mistakes.

So let's say your neighbor, who already has 23 unmatched sets of plastic flamingos on his front lawn, a broken boat trailer, and a mattress, has now brought back a coyote from a hunting trip. It howls all night, and you're writing a letter involving the word IDIOT, but you accidentally typed IDOIT. What happens then? You immediately *hear* a beep, so you know something's up. You instantly see a window that doesn't list IDOIT, but it does list IDIOT and its sound-alike words, so your screen window looks like this:

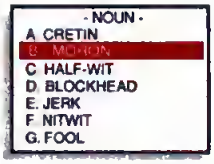


So you move your cursor to A, which is the correct spelling for IDIOT, hit return, and the spelling mistake is instantly fixed.

Turbo Lightning also gives you instant synonyms

IDIOT was the word you planned to use in your note next door, but is it the best word? And should you use that particular word since your neighbor fools around with his guns when he's full of whisky (which is every night), and besides that, he's 6'10", a black belt, and your cousin?

Because you have Turbo Lightning's Random House Thesaurus at your fingertips, you can look at the *synonyms* for IDIOT. Type in IDIOT and what you see is:



Any one of which expresses your opinion of your cousin's mental stature. So write the letter, but *don't mail it!*

Turbo Lightning won't forget your name

Teach Turbo Lightning your name and it's there—correctly spelled—forever. So are all the other names and words you teach Turbo to help run your business and personal life.

You can get Turbo Lightning for an incredibly low $99.95

Just $99.95 gets you Turbo Lightning, which is an incredible deal when you look at what you're getting: the access system or engine that powers the first two volumes *and future volumes* of the Turbo Lightning Library.

And for only $149.95, you can get *both* Turbo Lightning and the Word Wizard, which is so intriguing, you'll probably be up half the night. And if that happens, sneak next door around 4A.M., unchain the coyote, and let it run away!

NEW INTRODUCING WORD WIZARD,™ KEY TO THE LIGHTNING ENGINE™

Word Wizard shows you how to access, hook into, and work with Turbo Lightning's engine. It's the technical reference guide to the Turbo Lightning engine—but a guide which we've lightened up with games.

You get Turbo Pascal® source code with the Word Wizard, and all the technical guidance you'll need to start and run Lightning's engine.

Word Wizard's games include thousands of ways to jumble, scramble, unscramble, twist, turn, and boggle your mind. It solves what seem to be unsolvable cross-words and even lets you write cipher from the standard numbers on your telephone dial. Word Wizard challenges you, your family, the entire office—or whomever—to new tests of mental agility and wordsmanship. Sold separately, Word Wizard is only $69.95, or get it with Turbo Lightning ($99.95 separately) for only $149.95!

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> *Henry Kisor, Chicago Sun Times*
>
> Lightning's good enough to make programmers and users cheer, executives of other software companies weep
>
> *Jim Seymour, PC Week*"

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Outside USA add $10 per copy
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This price includes shipping to all U.S. cities

Payment VISA MC Bank Draft Check

Credit card expiration date ___/___

Card #

†You must have an IBM or true compatible running DOS 2.0 or later

My computer's name and model is

The disk size I use is: ☐ 3½" ☐ 5¼"

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State Zip

Telephone

CODs and purchase orders WILL NOT be accepted by Borland. Outside USA make payment by credit card or International Postal Money Order

*Special Bundle Price

**YES, if within 60 days of purchase this product does not perform in accordance with our claims, call our customer service department and we will gladly arrange a refund

†**Minimum system requirements.** *256K Hard disk recommended. Runs on IBM PC, AT, XT, PCjr, and true compatibles. Word Wizard requires Turbo Lightning software.*

L7

PC MAGAZINE FACT FILE

***FilePlan*, Version 3.0**
Chang Laboratories Inc.
5300 Stevens Creek Blvd.; San Jose, CA 95129; (800) 831-8080 (in Calif.); (800) 972-8800
List Price: $199.95 **Requires:** 256K RAM, two disk drives, DOS 2.0 or later. **In Short:** Geared to sales and client management, this limited database is too awkward and inflexible to be a truly effective organizing and filing tool; a few perks make it bearable to use but not really any more efficient. Not copy protected.

CIRCLE 606 ON READER SERVICE CARD

When you define your fields with FilePlan, *you enter headings, widths, data types, key values, and your prompt lines.*

option from the main menu lets you print your worksheet in a spreadsheet-type format with each record on a single line (as it also appears on-screen). If you want only to print certain columns or fields, you have to go back into the field format command and change the width of the fields you don't want to appear in the report to 0. So, of course, you have to go back and change them again for every different report you want to generate.

Luckily, the Merge Print command is a bit more rewarding, though still inefficient. With this command you can merge all or part of your worksheet into a form letter or mailing label. Chang Labs recommends that you use *SideKick* from Borland International, or another memory-resident program with a notepad, to make creating your form letters easier. Again, with *FilePlan* it's a cumbersome process, though once you do it a couple of times, it gets easier and a little less bothersome.

FilePlan has a few handy features that make it a bearable program to use, such as the ability to highlight certain records on the screen in either red, blue, white, or green using a combination of Alt and a single key (for example, Alt-R will turn the record red; if you're using a color printer, this record will appear in red). Also, *FilePlan* uses function keys to make editing easier, and if you press F9 you'll get a rather sparse help screen that explains each function key. Even with these perks, *FilePlan* is too awkward and inflexible for general database use or for salespersons who are in a rush. Release 4.0 is in the works, and perhaps some of these glitches will be smoothed out so that the new release of *FilePlan* will be a better product.—**Jane Mintzer**

■ *FilePlan* uses function keys to make editing easier, and if you press F9, you'll get a help screen that explains each function key.

FILING ASSISTANT AND REPORTING ASSISTANT

If simplicity is your bag, you'll love IBM *Filing Assistant* and *Reporting Assistant*. This duo from the IBM Information Services caters to those with low-end database appetites, who want modest functionality in lieu of feature-laden programs. Unfortunately, when you combine the price of both programs and consider the fact that you must run both if you intend to create a substantial report, things are not as simple as they seem.

IBM *Filing Assistant* and *Reporting Assistant* are unabashed copies of the incredibly popular *PFS:FILE* and *PFS: Filing Assistant*. The only apparent differences between the IBM and PFS versions are in the packaging. The IBM *Filing Assistant* program creates a form for data input and allows you to key in individual records. The *Reporting Assistant* generates tabular reports (up to 20 vertical columns) based on *Filing Assistant* records.

NO IMPORT/EXPORT FACILITIES

Filing Assistant has no data import/export facilities. Since I was devastated at the thought of having to key in my PC Magazine Labs test data, *Filing Assistant* forced me to resort to devilish alternatives. A colleague in the PC Labs was testing *Paradox*, which outputs to *PFS* format (among others). Since *PFS* and *Filing Assistant* are mirror images, I used *Paradox* to create a *PFS* format for my data and spared my fingers some agony. Despite this tortuous data entry procedure, *Filing Assistant* is otherwise the essence of simplicity. The program's main menu offers nine options. The program is characterized by a single, flat, free-form file structure. You opt to create a new database, design a blank form, and add corresponding data forms. You are a freewheeling agent on a big display screen, able to move about and paint your field names and titles. You cannot specify field lengths, cannot specify field types, and cannot establish any data-input validation criteria. This combination of freedom and restriction makes the design phase easy, but it leaves you open to the

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tential errors of unrestrained input.

One attractive feature is the multiple-page forms option. Each record can have up to 32 pages of data (even more if you attach pages during a forms update session). I wouldn't have the gumption to enter a 32-page record, but I think that social workers with case studies, researchers with indexed notes, and other people who need to organize long text entries would relish this freedom. Another nicety is the quick-entry specification—a simple macro feature to quickly fill in common information.

The *Filing Assistant* has no sorting or indexing capabilities. You may only perform a single-field ascending sort if you print your file. However, search features are easily implemented, and the program is capable of quick full and partial text and numeric searches of specified fields.

BOTH PROGRAMS NECESSARY Owning *Filing Assistant* without *Reporting Assistant* is like owning 35mm slides without a projector—viewing the goods is a nuisance. Without *Reporting Assistant* you can print, but not save, report specifications, and you are prohibited from performing any data manipulations. For an additional $129, *Reporting Assistant* lets you catalog and store a report format and perform handy column derivations, simple math, and aggregate functions.

Filing Assistant's choice of language is confounding to anyone who has used or plans to use another database. In *Filing Assistant*'s terms, a record is called a form; the design you create to input the data is also called a form. In this vein, you add forms to a blank form to create a file. Reports are printed "forms" based on design "forms." Perhaps calling everything in the database a "form" quells the novice's "file," "record," "field" phobia. However, as with the 26 Eskimo words for snow, I'd prefer greater precision.

A bargain is in the eye of the beholder. To their credit, IBM *Filing Assitant* and *Reporting Assistant* are easy to use. Although limited, they perform their tasks well. The programs' greatest weakness is an IBM marketing problem. Together, the duo sells for over $250. Other similar programs cost less and combine filing and reporting features into a single application. Lowering the price and bundling the components would increase the value.
—Robin Raskin

PC MAGAZINE FACT FILE

***Filing Assistant* and *Reporting Assistant*, Version 1.00**
IBM Information Services
472 Wheelers Farms Rd.; Milford, CT 06460; (203) 783-7536
List Price: *Filing Assistant*, $149.00; *Reporting Assistant*, $129.00
Requires: 128K RAM one double-sided disk drive, DOS 1.1 or later.
In Short: Unabashed copies of *PFS:FILE* and *PFS:Filing Assistant*, must be run together to create a substantial report. The cost is high, compared with others of their ilk, and facilities for importing and exporting data are not included. Copy protected.

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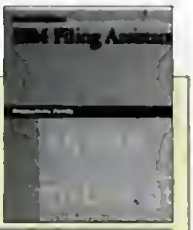

Filing Assistant's database uses a free-form design. You are able to paint the screen to your liking.

FIRST BASE

Before there were off-the-shelf software packages for microcomputers, there were OEMs. These original equipment manufacturers would generally sell you a machine and the software to go with it; they would install the hardware, customize the programs for you, and train the staff. Universal Data Research Inc., the maker of *First Base*, continues to offer these OEM-type services. It markets a number of business applications including accounts receivable, accounts payable, general ledger, and payroll, and uses *First Base* as a tool in developing and supporting these products, much as many consultants use *dBASE III* or *R:base Series 5000*. When Universal Data Research trains its customers in the use of the applications, it suggests that they obtain *First Base* as well, so that they can do quick queries and create additional reports for their business applications.

A PROGRAMMER'S TOOL While you can purchase *First Base* (formerly called *Data Base Manager*) separately and use it as a standalone database, its genealogy gives it quite a different look from the ergonomic, hand-holding, often elegant interfaces that are becoming the norm in the PC market. *First Base* is, above all, a programmer's tool. From an end user's point of view, the functions on the main menu are oddly apportioned, so that to create a new database you must know to select file utility programs, while querying is hidden in the Enter/Alter/Print/Delete Data function.

Each function is in a separate program, forcing a pause while *First Base* cranks up the next one, and at each new function you'll have to reenter the filename. When you create a new database, you are absolutely required to give it a volume number.

To use *First Base*, you, too, will have to be in a programmer's frame of mind. For instance, to display a record format that you have designed, you must choose the selection Alter Header, referring to the header, or the first, record of your data file, which is where the record format is stored.

First Base does not import data. If you make an error when entering new data,

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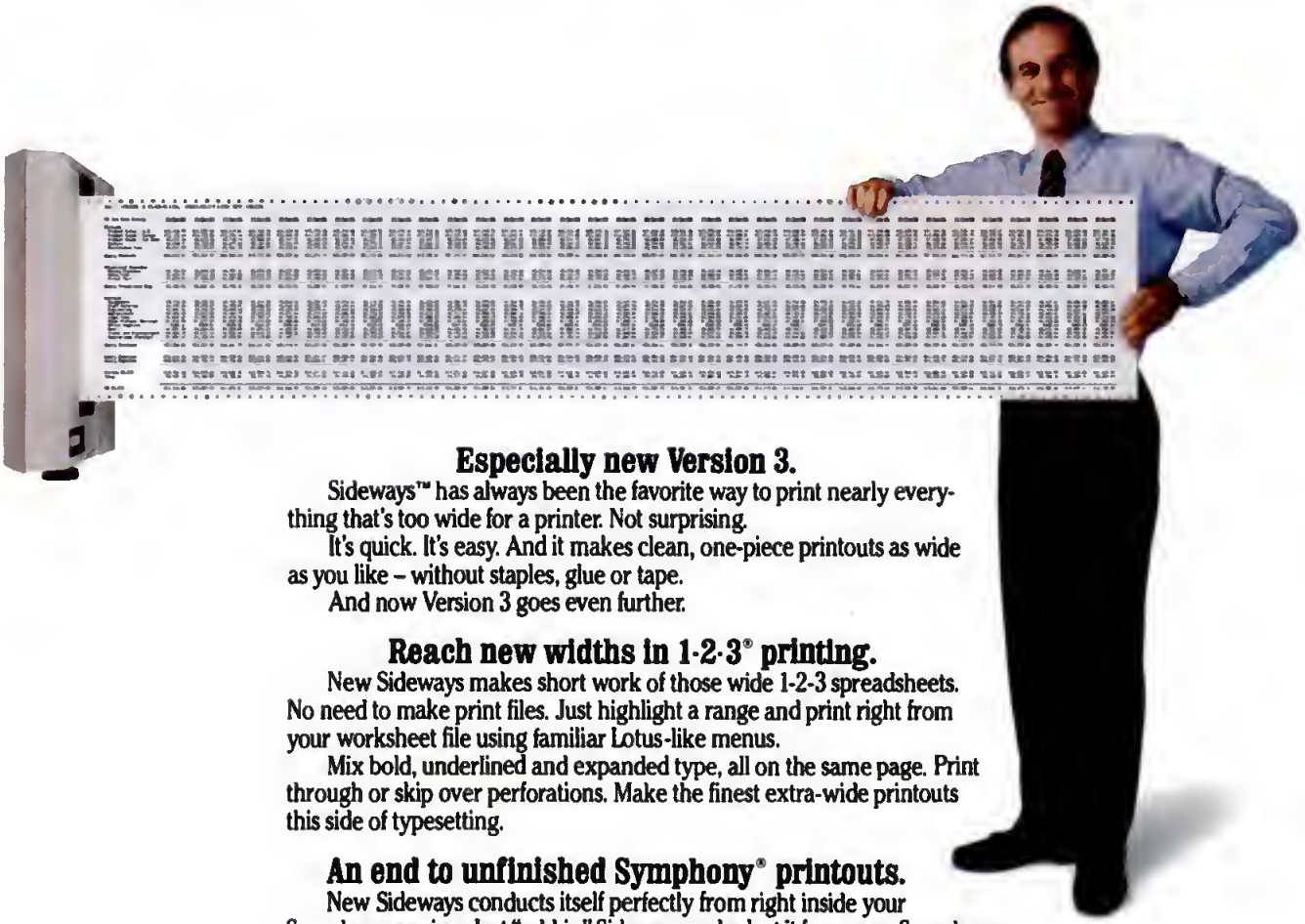

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PC MAGAZINE FACT FILE

UNIVERSAL DATA RESEARCH INC

***First Base*, Version 2.0**
Universal Data Research Inc.
2457 Wehrle Dr.; Buffalo, NY 14221; (716) 631-3011
List Price: $195 **Requires:** 64K RAM, one disk drive, DOS 2.0 or later.
In Short: Basically a programmer's tool, this program won't handle your business database problems effortlessly and quickly, but it can be a good way to sharpen your applications programming skills in BASIC. Not copy protected.

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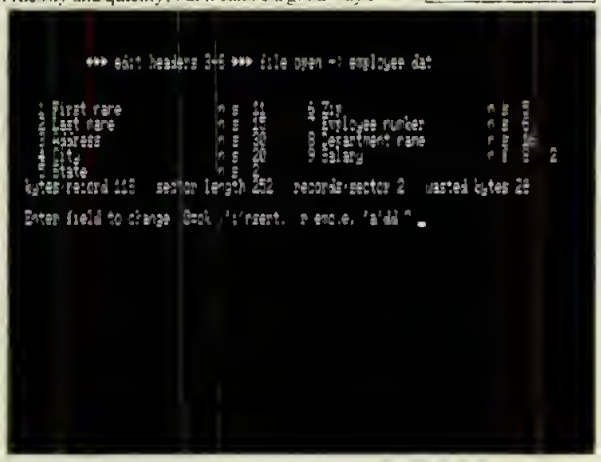

This screen, which displays the field attributes of the employee file, demonstrates First Base*'s editing technique.*

you may not correct it immediately. Instead, when you have completed a record, *First Base* allows you to specify a field by number and reenter its contents. Of course, this requires glancing back over a record to see where the errors are. You can reduce the effort of entering data somewhat by setting up a table of default values that *First Base* will enter automatically.

The query function has a similar barebones quality. Since there is no wildcard feature, you cannot request all last names starting with M. You can only ask for all last names that include a capital M, yielding DiMeara as well as Matuso. You can index your database with *First Base* or can do a one-level ascending sort.

FULL-FEATURED REPORTING The reporting function of *First Base* is comparatively full-featured, allowing you to choose the fields to be printed and their order, as well as to set conditions for selection and to total fields. You can save the report format for future use, but you cannot alter a saved format. *First Base* lets you specify a field title that is longer than its data field, but it will truncate the title when you print the report.

■ *First Base*'s genealogy gives it a different look from the ergonomic, hand-holding, often elegant interfaces that are becoming the norm.

The programmer's perspective continues with the language of the manual: it abounds with words such as *operator*, *ISAM*, and *abort*, and blithely refers to the hole fill map and the Shell Metzner sort.

The program worked fine with an Epson FX-80 printer, but it wouldn't print at all with an FX-85; the package doesn't include an automatic printer setup.

A perhaps unintended but very real value of *First Base* is as a tutorial for improving one's applications programming skills in BASIC. The documentation describes the major subroutines and how to use them in conjunction with your own programs. It explains how *First Base* does its screen editing and even prints the BASIC code for displaying *First Base*'s main menu.

According to Universal Data Research, *First Base*'s antecedent is a database for a multiuser environment on a minicomputer, a situation in which systems-support personnel are available to assist users. In downloading, little attempt has been made to retrofit the program to the off-the-shelf PC business software market, in which one of the first rules is that the plumbing must be hidden from view. As a support tool for Universal Data Research's business software, *First Base* has no doubt proven its worth, but as a competitive Category 1 database for the PC, *First Base* is aptly named.—**Stephanie Stallings**

INFOSCOPE

Infoscope, a fresh solution to personal data-processing needs, offers features not available on any program in its class. Like *Reflex*, *Infoscope* lets you view your data from different perspectives and change views in the blink of an eye. Although the program is not relational and therefore should not be considered as the basis for serious business applications, *Infoscope* also makes a wonderful analytical tool in conjunction with business database programs that produce ASCII delimited files.

Infoscope is very different from every other database program I've used. It was designed for personal applications that do not require multiple file relations nor access to more than 8,196 records per file.

However, *Infoscope* allows you to load the contents of up to eight different files into twelve different "scopes"—think of a scope as a window containing a set of data—and keep them all on-screen. Each scope may use a different border color, which can be used as an alias name for that set of data, and the scopes are easily shuffled around the 255-character-wide scrolling display.

STACKING UP SCOPES You can stack up the scopes on top of one another and call them to the top of your "desk" one at a

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time. Or you can overlap them, place them side by side, put them to "sleep" to reduce memory overhead while keeping the file open, and so forth. Multiple scopes allow you to view the contents of different files quickly or to view the contents of one file a dozen different ways. For example, you could open the company payroll file into scopes sorted by employee (listed alphabetically), department, salary, date of last increase, and so forth and then call one to the foreground, focus on specific records, and print a report.

I'd like to air all the limitations of *Infoscope* at once because if you can live with them, you'll love the rest of the program. First, the display scrolls to 255 characters, the maximum any record can hold. That means you could design a file with one 255-character field or a file with 25 10-character fields, or any other way you can divide 255 characters. For data entry/editing, there is no such thing as range testing, default values, lookup tables, or calculated fields.

The weakest link in *Infoscope's* chain is its report functions, or the lack thereof. You can't specify totals, subtotals, or break points. All you can do is print the contents of a scope. However, this is much more powerful than simply printing the contents of a file.

■ *Infoscope* is a fast and fancy tool that dares to be different. Don't be put off by its unfamiliar approach to familiar problems.

Scopes are the heart of *Infoscope;* they are files that have been sorted and filtered to contain information in a specific order. You can remove or rename fields in a scope to make it smaller or more readable. You can sort it on as many fields as it has faster than any program I've seen. Just for fun I loaded the 500-record PC Magazine Labs test file and sorted it by department, salary, state, last name, and first name. Two and a half seconds later I saw the results. In the next few seconds I hid the address and employee number fields so that the list fit on the 80-column display, sent it to the printer, and saved it to a disk file for future reference.

SEVEN LEVELS OF COMMANDS You may communicate with *Infoscope* in two ways. The slash bar opens a *1-2-3*-like menu at the bottom of the screen in which commands are structured on seven levels. Once you know a command, you may type it directly on the command line and save time. The most important command in conjunction with sorting is Focus. Let's say you're keeping track of dozens of project schedules and you have this file in a scope that is focused on projects for ABC Corp. with deadlines in July. The only records appearing on-screen fit those criteria, and you can add to the focus at any time as many criteria as you like. Then, with the simple command Try Month August, you would get the same view of all your ABC Corp. projects with August deadlines, within 1 or 2 seconds.

I can't say enough about *Infoscope*. It's a fast and fancy tool that dares to be different. This program is *not* just another easy-to-use database; so don't be put off by its unfamiliar approach to familiar problems. That feeling won't last longer than the excellent hour-long tutorial anyway.
—Phil Wiswell

PC MAGAZINE FACT FILE

***Infoscope*, Version 1.01**
Microstuf Inc.
1000 Holcomb Woods Pkwy., #440; Rowsell, GA 30076; (404) 998-3998; (404) 998-7998
List Price: $79 **Requires:** 192K RAM, one disk drive, DOS 1.1 or later.
In Short: Designed for personal applications, this database is fast, fancy and, above all, different; it also makes a great analytical tool in conjunction with business database programs that produce ASCII delimited files. Not copy protected.

CIRCLE 602 ON READER SERVICE CARD

Infoscope's "scope" method of presenting files allows you to reorganize your fields quickly in any order, hiding or showing them as you wish.

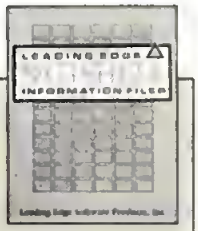
NUTSHELL

From the instructions on formatting floppies and running the installation batch files to those showing switch settings for dozens of popular printers, *Nutshell* and its paperback manual are aimed at the computer novice. The Quickstart section at the beginning of the manual runs you through *Nutshell*'s major features. It's the next best thing to an on-line tutorial, with a screen snapshot nearly every page. The sample databases included on disk are also explained in the manual.

EXCELLENT ON-LINE HELP The on-line help truly is context sensitive. When you create a new file, the help screen sug-

PC MAGAZINE

FACT FILE



***Nutshell*, Version 2.0**
Leading Edge Software Products Inc.
21 Highland Circle; Needham Heights, MA 02194; (800) 343-3436
List Price: $150 **Requires:** 256K RAM, one disk drive, DOS 2.0 or later.
In Short: A simple menu-driven filer that can handle databases with a lot of text. *Nutshell* is also particularly good at generating mailing labels; its documentation makes it easy to learn. Not copy protected.

CIRCLE 695 ON READER SERVICE CARD

In Nutshell, *a field can extend over several lines; words will reformat as you add and delete text.* Nutshell*'s "index" is a dictionary of the words or values that occur in the given field for all currently selected records.*

gests you define some fields. Asking for help when browsing through an empty file produces a recommendation to add some records.

The help screens include page numbers in the manual to turn to for more information. The people answering the toll-free technical-support line were prompt, polite, and patient; they were even knowledgeable and helpful.

The Browse screen is the heart of *Nutshell*. Each record is shown on a separate screen. The PgUp and PgDn keys let you scroll through the records or move to the first or last record in the file.

When you define a file, *Nutshell* builds a default "layout" of the fields and field names. You can build and store many different layouts; they control how the data appears on the Browse screen and how it's printed in your reports. You edit a layout by selecting a field or field name, then pointing to where it goes or how far it should extend.

Unlike most databases, *Nutshell* treats a text field as a sequence of words, not just characters. Fields can be several lines long, with word wrap and automatic reformatting. This is great for databases that consist of long stretches of English text; for example, a collection of "trouble reports" that include several sentences of explanation and problem resolution. *Nutshell* can give you a list of all the words that occur in a given field (for all the currently chosen records), just like the index of a book. In a query, you can find, for example, all the records with a Comments field that includes the word *none*.

A GOOD MAILING-LABEL GENERATOR *Nutshell* is particularly good for generating mailing labels. You can ignore trailing blanks; so, for example, "John Doe" will have only one space between the first and last name, even if you've defined first names to be up to 15 letters. You can easily print multiple columns of labels. You can even make very crude form letters or exchange an address list between *Nutshell* and the Merge Print feature of the *Leading Edge Word Processor*.

Nutshell's documentation makes it easy to learn; its design makes it easy to use. If you want a simple, menu-driven filer, if you need to print labels, and especially if your database has lots of text, *Nutshell* is worth considering.—**J.H. Smith**

OMNIFILE

Despite its name, suggesting omnipotence and omniscience, *Omnifile* is simply a well-designed database program for handling flat files. Its menus guide you through all the steps necessary to select records, set up calculated fields, execute mass changes, and design flexible reports.

The installation procedure for placing *Omnifile* on a hard disk is almost automatic. The program requires a key disk, but in exchange for your warranty card, SSR Corp. will send you a backup copy that does not require a key disk.

Omnifile's menu screens consistently identify the current function along the top border and display the operative function keys along the bottom.

Omnifile simplifies the process of creating a database by combining record definition and input form design into one procedure. You can also create alternative forms that are subsets of the original. Just as one file can have several forms, several files can share a single form; *Omnifile* needs a directory to plot these relationships.

A MASS CHANGE FUNCTION You can use *Omnifile*'s mass change function to change the structure of the database after you have entered data. If you alter the data specification of a field on one form, this change will automatically be made on all the forms on which the field appears, but if you want to rename a field, you'll have to make the change yourself on each form.

Omnifile treats importing and exporting as types of file copying, but regardless of the name, the program imported the .SEQ test file without a hitch. It also handles .DIF files, and, when directed to make copies of files that are in *Omnifile* format, it copies all related dictionaries, forms, indexes, and report specifications.

You can edit the new data by specifying the valid entries for a field, by setting default entries for fields that can be bypassed, and by forcing entries to be made in other fields. *Omnifile* can automatically include the current date in the record and can complete calculated fields as the record is accepted. You can also validate the users of the database with the field-level password utility.

The program can create indexes at any time, and a reorganization utility makes it easy to reindex a file after records are added. Up to five fields can be contained in an index key.

CONSISTENT SELECTION TECHNIQUES *Omnifile* uses two techniques, selection by condition and by derived fields, throughout its query, mass change, and reporting functions. This consistency makes *Omnifile* easier to learn; it's aided by the manual, which repeats the relevant information in each section rather than making you hunt for it. To select a group of records by condition, you specify the number of the field in question, the condition (such as = or <), and finally the number of another field or a value to which the first field should be compared for each condition. Derived, or calculated, fields are defined through the use of a similar fill-in-the-blanks menu. You can save conditions and derived fields in the reporting and mass change functions, but not in the query feature.

Omnifile's report function, aptly named Anyreport, deftly guides you through a multistepped procedure for printing reports and labels. On separate menus you specify which fields are to be included in the report and which are to be totaled, averaged, or counted. *Omnifile* can sort records on up to four levels, with or without subtotals on sort breaks and in ascending or descending order. In addition, you can specify whether or not duplicate key fields should be printed. Review screens enable you to check, change, and save the report specifications.

The *Omnifile* manual is a little unusual in that it has no reference section but is divided between a tutorial and a set of sample applications. The tutorial functions quite adequately as a reference, in part because it is thorough and in part because *Omnifile* is a relatively simple program. But the manual would be a stronger reference tool if the table of contents and the index were both more detailed.

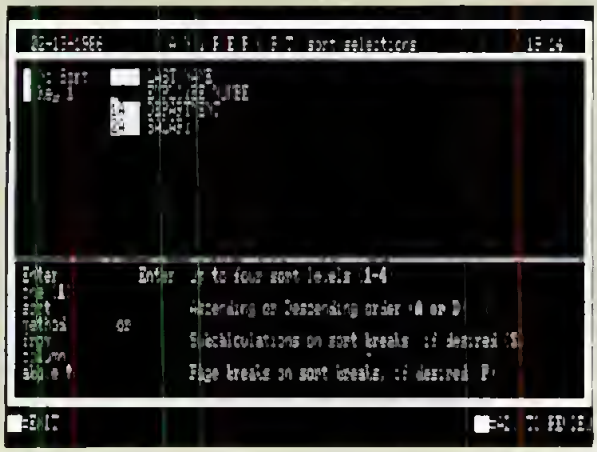
Omnifile is a quite decent Category 1 database that will satisfactorily meet the needs of many users. But being well thought out isn't enough in the glutted PC database market. To become omnipresent, *Omnifile* would have to be as omniadvertised as the big guys.

—Stephanie Stallings

PC MAGAZINE FACT FILE

OMNIFILE
THE PROFESSIONAL'S INFORMATION MANAGEMENT SYSTEM

***Omnifile*, Version 2.0**
SSR Corp.
1600 Lyell Ave.; Rochester, NY 14606; (716) 254-3200
List Price: $425 **Requires:** 256K RAM, two disk drives, DOS 2.0 or later.
In Short: A well-designed, capable, easy-to-use, menu-driven database program for handling flat files. *Omnifile* can meet the needs of many users. Not copy protected.
CIRCLE 694 ON READER SERVICE CARD



Omnifile's sort screen displays all available features, which you request by placing the alphanumeric codes next to the field names.

1-2-3, RELEASE 2

Lotus Development Corp.'s *1-2-3*, the best-selling, top-notch spreadsheet program, also includes some database management capabilities. It's not relational and doesn't do indexing, but both sorting (with primary and secondary keys) and finding records that meet certain criteria are as fast and easy as the program's name.

A *1-2-3* database looks like a spreadsheet, set up on a large worksheet of 254 columns and 2,048 rows. Smooth-running commands lead you through building and manipulating a database. In addition, *1-2-3* includes special database-oriented statistical functions: the number of items in a list, the arithmetic mean, the minimum and maximum values, and the standard deviation and the variance. Also, *1-2-3*'s Transfer utility transfers files from such programs as *dBASE*, *Jazz*, and *Symphony*.

You initiate each command with a slash, followed by your choice of the commands that then appear on the menu at the top of the screen. As you highlight each choice by moving the cursor keys, you see below it the submenu. Highlighting File, for example, shows you the submenu for that command: Retrieve, Save, Combine, Xtract, Erase, List, Import, and Directory. Deciding on the best choice is easy when you move the cursor along the line of choices, watching the submenus change—almost like an ever-ready, ever-visible help screen. Pressing the Esc key at any point will back you up a step: holding it down takes you back to the beginning (you'll see "Ready"). Another feature that makes life easier is the way *1-2-3* enables you to indicate cell ranges either by highlighting them with the cursor or by typing in the range address.

THE /DATA COMMANDS The most relevant commands for database management are under the Data command heading. One important step after importing an ASCII file is to parse the data (/Data Parse), which really means to format it for *1-2-3*. (On the same page as it describes the /File Import command, the program's reference guide should prominently note the fact that your ASCII file won't work until put through the /Data Parse process;

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***1-2-3*, Release 2**
Lotus Development Corp.
55 Cambridge Pkwy.; Cambridge, MA 02142; (617) 577-8500; (617) 253-9150
List Price: $495 **Requires:** 256K RAM, one disk drive, DOS 2.0 or later.
In Short: This venerable spreadsheet is also a database with smooth, easy-to-use commands but no indexing. Copy protected.

CIRCLE 603 ON READER SERVICE CARD

The Data option on the main menu of 1-2-3 *gives you a variety of data management choices on what is essentially a spreadsheet.*

you can waste time finding out what's holding things up.)

The /Data Sort command sorts records according to the contents of one of the columns. First you specify the range to sort. Next you choose the primary sort key by highlighting or entering the address of any cell in the field that you want to determine the new records order, and then you select ascending or descending sort order (you can also select a secondary sort key to arrange records that have the same primary sort key in a specific order within the primary one, by salary within department, for example). Then you select Go, and speedy *1-2-3* does the sort for you. A timesaving feature of the program is its default settings. The worksheet retains the last-specified data range, sort keys, and sort orders for future use.

The /Data Query Find command locates records that match your criteria. First you specify the input range—that is, all the field names and records you want to search. You then set up a criterion range in a blank part of your worksheet and copy the field names you want (up to 32 fields)—for the PC Magazine Labs tests we used last name and city. Under them you enter the criteria, such as Williams and Poughkeepsie, for example. When you select Find, *1-2-3* highlights the matching records or beeps if it finds none. /Data Query Extract copies records that match your criteria to another part of your worksheet, in effect creating a makeshift report. Although *1-2-3* doesn't really generate reports, *Report Writer*, a standalone companion product, creates and stores reports from a *1-2-3* database.

The documentation is first-rate. One note: if you move or copy any data, be sure you're putting it in a blank part of the worksheet; as *1-2-3*'s manuals warn you repeatedly, it will copy over existing data (alas), not move it aside (which would be a nifty improvement). If you use *1-2-3* as a spreadsheet, by all means take advantage of its /Data commands. And if you're intimidated by *1-2-3*'s spreadsheet powers, using the program as a database manager might be a good way to get to know it. But remember, although fast-working and easy to use, its database features are not as sophisticated as its number-crunching abilities and are surpassed by those of some database-only packages on the market.

—Carol Olsen Day

OWL A-B-C

In the lingo of Owl Software, developers of *OWL A-B-C*, A is for Advanced Word Processing, B for Business Tools, and C for Communications. An integrated package that combines word processing, mail-merge, database management, scheduling, telephone dialing, and terminal emulation, *A-B-C* does what it claims it can do fast. Little effort or experience is required on your part. The disappointment is that the program is fairly limited when it comes to database management. It can't index, won't import an ASCII file easily, and two-field searches aren't part of its lexicon.

CREATING A DATABASE FILE You create an *A-B-C* database file the same way you create a word processing file. After you choose C for "Create a new file from the main menu," *A-B-C* prompts you to choose the letter from the Text Files column or the Data Files column that corresponds to the kind of file you want. Data file choices include 3, 4, and 5 for three-, four-, and five-line mailing labels; B for Bar chart file, D for Data file, P for Phone list, R for Record of phone calls, S for Schedule of appointments, and T for Tabular file. Choosing D for Data file in turn lets you select various formats. For most databases you'd choose a general data file. *A-B-C* prompts you to define the fields in the file. After you define the fields, you begin to enter the records, one on each line *A-B-C* sets up for you. Using the cursor to move within the record, you can change, insert, or delete. Function keys displayed at the bottom of each screen allow you to scoot around the file quickly, insert and delete records, search for a character string, and so forth. You can choose to define new fields, add file commands, or change/view file commands from the command submenu. After you've input all your records, you can see how the data will look when printed by choosing D for Display current file.

When you've finished creating a file, you save it to disk by choosing F for File options from the main menu and then S for "Save file to disk" from the submenu. *A-B-C* warns you to save the current file if

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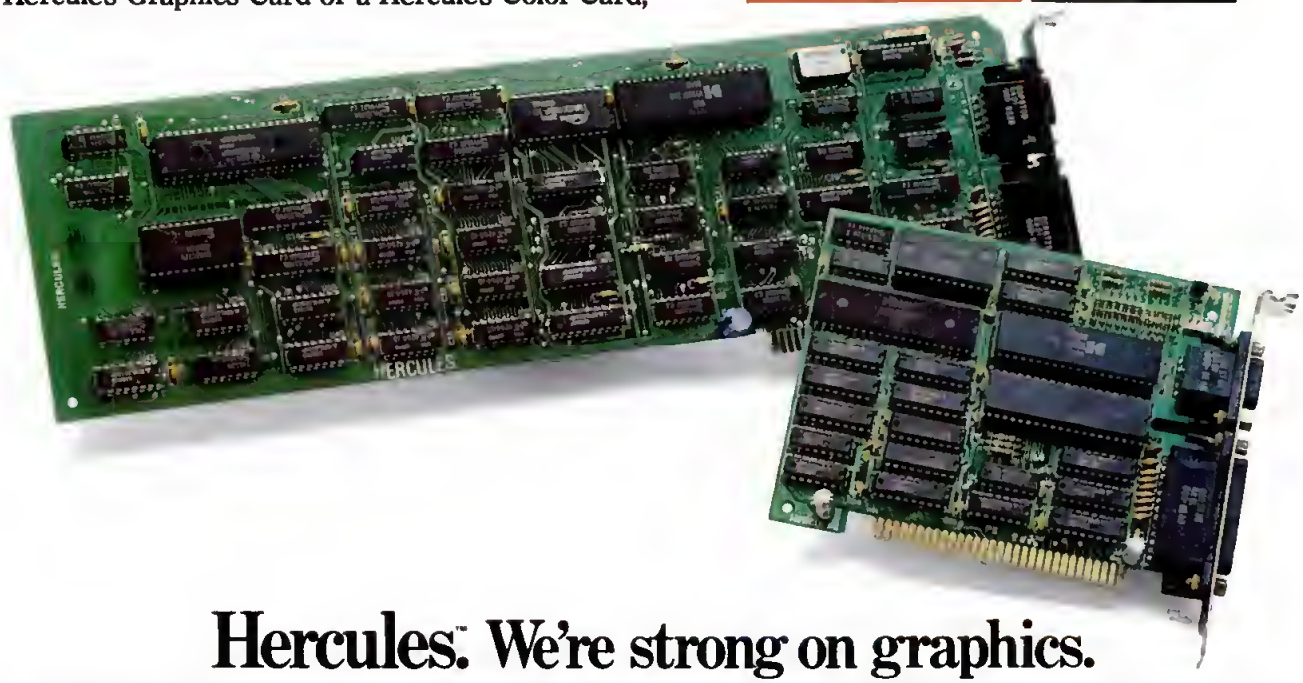

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you try to choose another option or view another file before saving. It tells you to save the file before sorting it, for example. You start the sort with the file in memory. The program displays the field numbers and names and asks you to enter the field numbers you want to use for the sort. You enter the major sort field first, for example, the department each employee on your list works in, and the secondary sort field second, say salary. *A-B-C* sorts in ascending sequence only. It sorts the records quickly, however, and tells you that the sort is completed. You can then request to see the displayed report, showing in this case employees by department and salary.

DATABASE LIMITATIONS What's particularly limited about *A-B-C*'s database is its search facility—not to mention the fact that the program doesn't do indexing of any kind. You cannot search for two criteria at once. If you ask *A-B-C* to find all employees in your database who are named Williams and live in Poughkeepsie, it can only tell you who is named Williams, or who lives in Poughkeepsie, but not both. A roundabout solution to this problem involves creating a new database of employees named Williams living in Poughkeepsie: You'd first retrieve your database that includes the employee last name and city records, select M for More options from the main menu, and then indicate the records for the program to select, in this case 2 = Williams and 4 = Poughkeepsie (2 indicates last name; 4, city). (Scanning a small database yourself to find any Williams living in Poughkeepsie might be faster.)

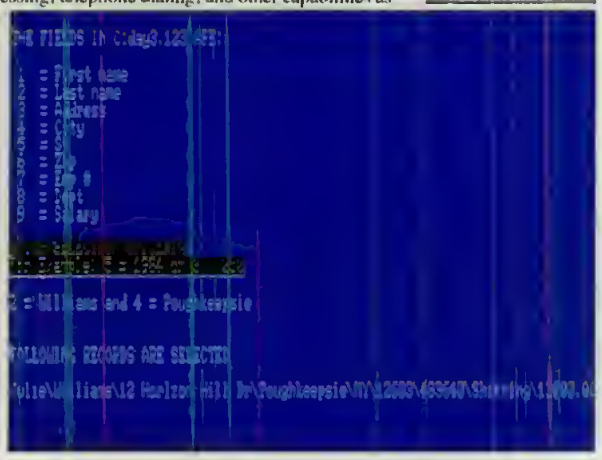
A-B-C comes with a demo/training disk that includes a demonstration of its main features, training files to help you begin to use the program quickly, and sample files that show you some of the standard formats available. The 224-page, indexed manual is for the most part clear and easy to follow, although some spelling errors in the text and page number mistakes in the index can be annoying if you're looking for perfection. Once you get to know the program, you quickly forget about them though.

Despite its admitted limitations, *A-B-C* is a nifty little package. If you're new at word processing, inexperienced with databases, and interested in getting all your office and personal writing, filing, and scheduling work done with one easy-to-use package, *A-B-C* can fit your needs for $240. But you wouldn't give it a second look as a database manager if you also weren't interested in its word processing and handy telephone dialing capabilities.—**Carol Olsen Day**

PC MAGAZINE FACT FILE

***OWL A-B-C*, Version 1.0**
Owl Software Corp.
15643 Sherman Way, #210; Van Nuys, CA 91406; (800) 437-2769; (818) 989-0883
List Price: $240 **Requires:** 192K RAM, two disk drives, DOS 1.1 or later.
In Short: With word processing, telephone dialing, and other capabilities as well as limited database management, *OWL A-B-C* is an all-in-one starter package for individuals or small businesses that don't require indexing or two-field searches. Not copy protected.

CIRCLE 679 ON READER SERVICE CARD



One way around the fact that OWL A-B-C *does not search for two levels of criteria at once is to use the retrieve and select functions.*

PC-FILE 'N REPORT

PC-File 'N Report is an easy-to-use file manager with some interesting bells and whistles. For a suggested retail price of $59, you receive the file manager, a report generator, a memo writer, and a graphing utility.

You create input screens with the program by typing onto an empty screen. To indicate where input data will go, you use open and closed brackets. One convenience when creating the input screen is a repeat-character function key that is useful for enhancing the look of the input form.

Although you can type anything you want on a screen, field names cannot have leading, trailing, or embedded spaces. This creates a problem if you type field names such as last name and first name, since *PC-File 'N Report* treats both as "name." Also, if you try to align input fields vertically, you must use one or more periods (or other character) between the field name and the open bracket. Screen designs can be changed at any time.

You can define any field in an arithmetic relationship to other fields. Formulas are entered in a table that lets you easily view any formulas in a particular file.

TABLE-LOOKUP A table-lookup feature, something not usually found even in relational databases, lets you write data from one file to another based on a field common to both.

Two real conveniences of the program are a label-printing utility and a memo writer that can accept database fields (used for mail-merge). The label printer has all the niceties you might want: labels can be created in various sizes; multiple labels can be put on one line; a common line such as "Happy Holidays" can be added to each label; and extraneous blanks and blank fields are omitted from labels. An annoy-

ing feature is that the display blinks when you are printing labels. As for the memo writer, you can enter database fields into a letter to create form letters, but you cannot directly move reports or graphs into a memo page.

The graphing utility is not yet complete. With this verion (5.0), you can create bar graphs, but only by entering data manually into columns of a table.

File size is limited to the size of the disk (floppy or hard), with an important restriction: If you intend to sort or reorganize a file, you must have disk space available equal to the size of the file. This means that you probably wouldn't want to create a file larger than half the capacity of a disk.

AUTOMATIC FORMATS The program does not allow you to format reports—it formats automatically based on the size of the fields. Therefore, your report always will have its fields in vertical columns separated by one space and centered on the page.

PC-File 'N Report is a compiled BASIC program, which means that it is relatively slow at sorting data. To speed up sorts, a fast-sort feature lets you limit the number of characters that a field is sorted on. Normally, the program sorts on 14 characters and up to five fields in ascending or descending order.

Overall, *PC-File 'N Report* provides an excellent array of features at a sensible price. It is a good choice for people with relatively small files who want a product for generating form letters and mailing labels and writing short reports.

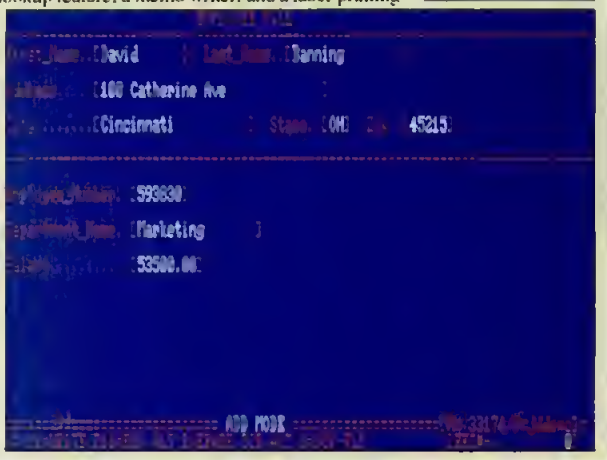
—Joe Desposito

■ *PC-File 'N Report* is a compiled BASIC program, which means it is relatively slow at sorting data. To speed things up, there's a fast-sort feature.

FACT FILE

***PC-File 'N Report*, Version V.5.0**
Jaspir International Inc.
24 Salrite Ave.; Waldwick, NJ 07463; (201) 445-8535
List Price: $59.00 **Requires:** 96K RAM, one disk drive, DOS 2.0 or later.
In Short: Easy to use and inexpensive, this file manager has some impressive features, including a table-lookup feature, a memo writer, and a label-printing utility, but you're restricted to reports always in the same format. Not copy protected.

CIRCLE 677 ON READER SERVICE CARD



PC-File 'N Report's input screens are "painted" onto a blank screen and can include headings and lines.

PFS:FILE AND PFS:REPORT

PFS:File and *PFS:Report* from Software Publishing Corp., which have been on the market for as long as the IBM PC has, have enjoyed a great deal of success—for good reason. The programs are reliable and a snap to learn and use, and they have excellent documentation. Add to this the fact that you can use them with other Software Publishing products, such as *PFS:Write* and *PFS:Plan*, and you have a very powerful entry in the low-end database arena. For these benefits, Software Publishing Corp. offers *PFS:File* and *PFS:Report* at suggested retail prices of $140 and $125, respectively, certainly premium rates for this product category.

HOW PFS:FILE WORKS To create an input form, all you have to know is that field names are followed by a colon. Thus you don't have to be concerned with field lengths or whether a field is alphabetic, numeric, or anything else. In the normal course of things, *PFS:File* treats every entry as alphanumeric. How then can you do calculations? In this latest version of *File*, you can establish calculated fields on an input form. If you want this kind of field, you enter a formula on a special formula specification form. *File* automatically treats data in a calculated field and its associated fields as numbers.

Another new feature of *File* is the Ditto key. It allows you to bring the contents of a field from a previous record into the current record. This is convenient when you have to type the same information, such as city and state, on a number of different forms.

Although there is no indexing per se in *File*, the first field of each record is automatically indexed. The index is used only if you are searching for an exact match. You can take advantage of this timesaving feature by placing the field most likely to be searched as the first one on the input form.

A nice feature of *File* is the attachment page. If you are entering data into an input form and find that you need another field or two that you hadn't included on the

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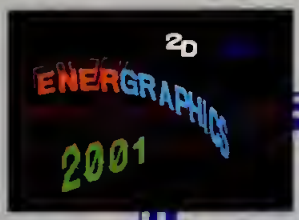

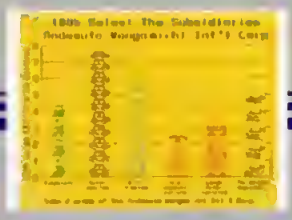

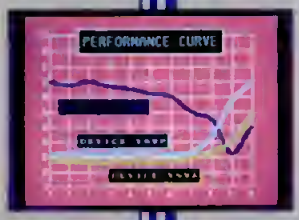

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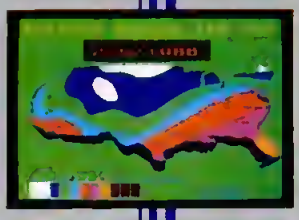

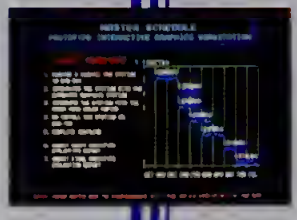

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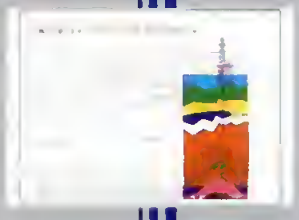

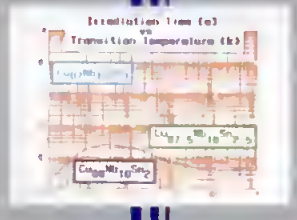

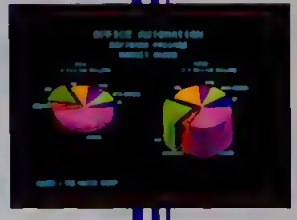

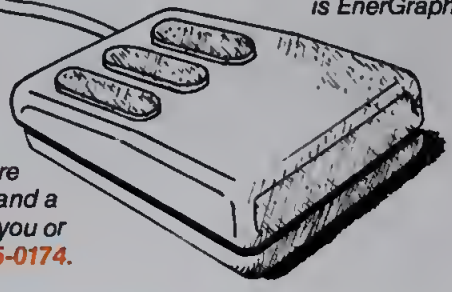

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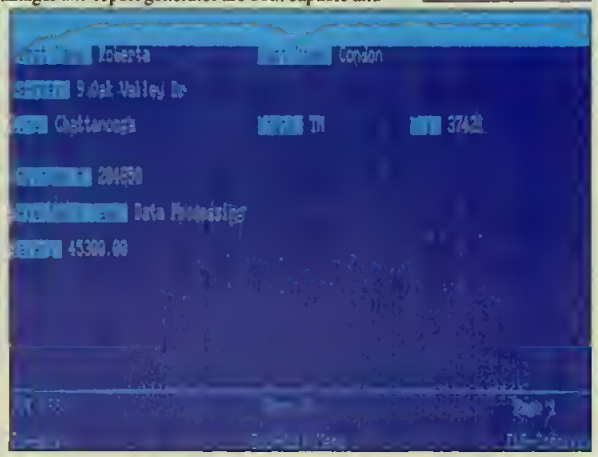
CIRCLE 134 ON READER SERVICE CARD

PC MAGAZINE FACT FILE

PFS:File and *PFS:Report*, Version B
Software Publishing Corp.
1901 Landings Dr.; Mountain View, CA 94043; (415) 962-0191; (415) 962-8910 **List Price:** *PFS:File*, $140; *PFS:Report*, $125 **Requires:** 128K RAM, one disk drive. DOS 2.0 or later. **In Short:** A powerful combination, this file manager and report generator are both capable and easy to use; and they're worth the high price. Copy protected.

CIRCLE 680 ON READER SERVICE CARD



PFS:File *lets you "paint" your input form on the screen. Notice that the prompts for help and the main menu are very much in evidence.*

form, you just press the PgDn key and an attachment page appears.

HOW PFS:REPORT WORKS *PFS:Report* works hand in hand with *PFS:File* to print reports from the database. There isn't too much flexibility, though. *Report* prints all columns of the report a few spaces apart centered on the page.

The new version of *Report* lets you do totals-only reports; that is, it will calculate and print totals, without having to print associated records. Another new feature is invisible columns. This lets you leave out certain columns of a report even though they might be included in formulas for columns that do appear in the report.

A feature of *Report* that I like is its ability to print a report based on a key field in a *File* input form. For example, if you have a form with a text field that contains abstracts of magazine articles, you could include an additional field in the form to hold key words from the abstract. *Report* can locate all abstracts that contain a key word.

The biggest knock I have against *PFS:File* and *PFS:Report* is that the programs cannot perform some simple tasks. For example, you cannot print multiple labels on a line or print multiple headers on a report.

But if you can live with shortcomings like this and are willing to pay the somewhat inflated price, you will own a very capable file manager and report generator. Over the long run, you will find that this combined product is worth its price.
—Joe Desposito

PLEASE

One of the problems that corporate MIS managers are paid to worry about is data integrity. Can interlopers peek at sensitive data? Can inept employees debase the database? These problems are especially vexing when they involve PC-based file management systems, which are often designed without password protection and other data safeguards standard on mainframe database systems. *Please* tries to do away with this problem.

Please is a menu-driven file management program from Hayes Microcomputer Products, the company that builds the best-selling Smartmodem line of modems. The program has passwords and data safeguards galore, enough perhaps to give your company's MIS manager a few nights of untroubled sleep.

THREE-LEVEL PROTECTION Any *Please* data file can have up to three levels of password protection. Users with the lowest-level passwords can merely look at the data and run reports. Those with the next higher level can modify the data as well. And those with the highest-level passwords can change the actual structure of the database.

Thus *Please* firmly locks the front door in the face of possible database intruders. Unfortunately, the back door is still wide open.

Please's files use ordinary ASCII text, so that anyone who knows how to use the DOS TYPE command can browse through the data at will. So, if security is a high priority, *Please* by itself is not enough. You'll probably want to add data encryption facilities as well.

While the program's passwords guard against unauthorized access, data-editing safeguards help protect your database from ordinary errors.

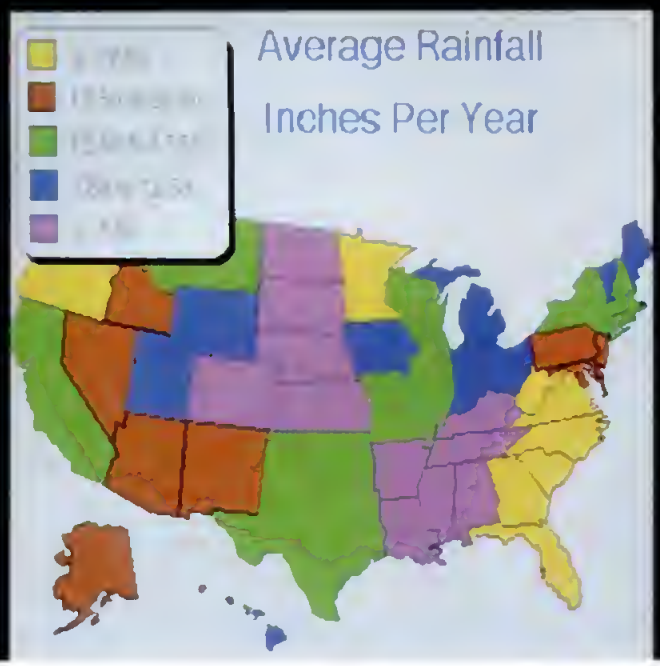
When you create a *Please* database, you can make sure that incoming data fits a predefined format or that it fits within a certain range of values. You can also specify default values or require data to be entered in certain fields.

A handy "today" variable inserts the current date into your record.

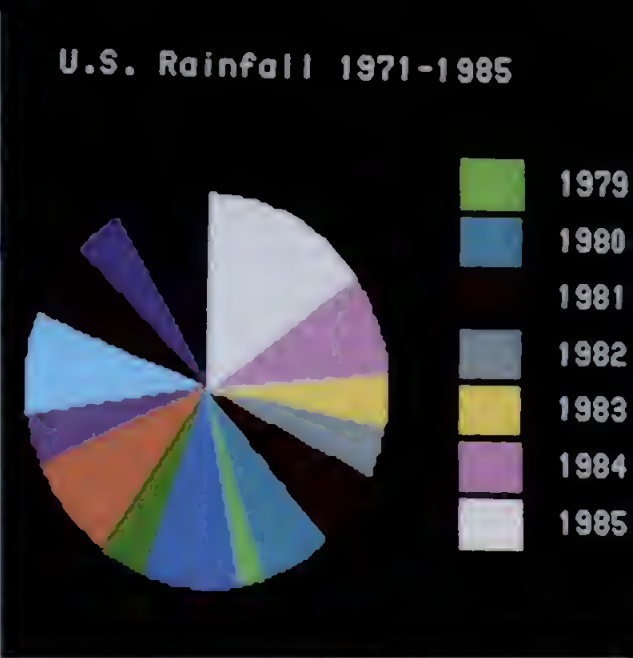
And a math function that acts like a calculator that can remember formulas allows you to calculate dependant fields from your other data.

AUTOMATIC INDEXING AND MORE When you create a *Please* database, the program produces a standard data-input form, with your field names and room for data in each field. If you want a fancier, customized screen, you can "paint" an input form after the database is created.

Please automatically indexes your database, using the first data item in your file. The program allows duplicate values in your index, so you can use a field like "last name" for your indexed field. Record retrieval using an index is almost instantaneous.



EGA Mode



Plantronics Mode

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AutoSwitch. Only Paradise has it.

The Paradise AutoSwitch EGA changes video modes automatically to work with your software. No Mode commands. No special software to run. On RGB monitors it "autoswitches" between EGA, CGA (IBM Color Graphics) and Plantronics modes; on monochrome monitors between EGA, MDA (IBM Mono Text) and Hercules modes. The Paradise AutoSwitch EGA runs any PC software you want. Immediately. Automatically. That's something ordinary EGA Cards can't do.

Runs all EGA, CGA, MDA and Hercules Software with true hardware level compatibility.

True hardware compatibility makes the Paradise AutoSwitch EGA Card different from other EGA Cards. No other EGA Card offers the

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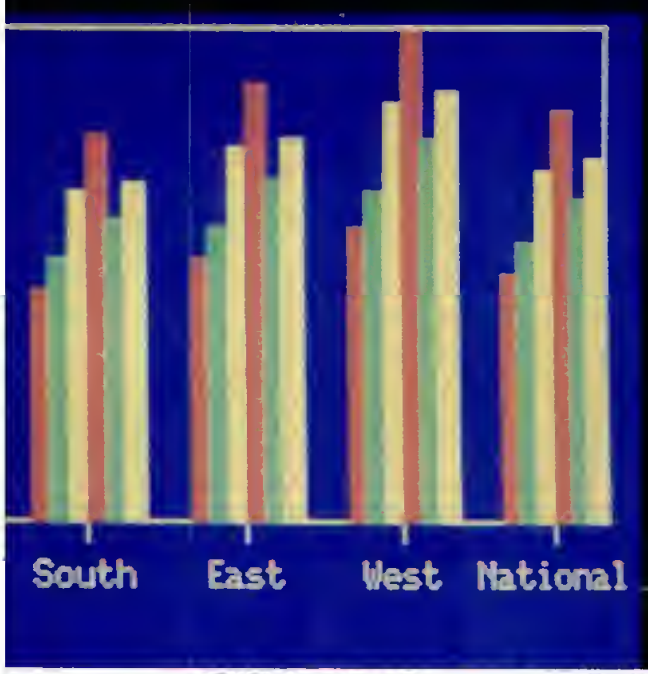
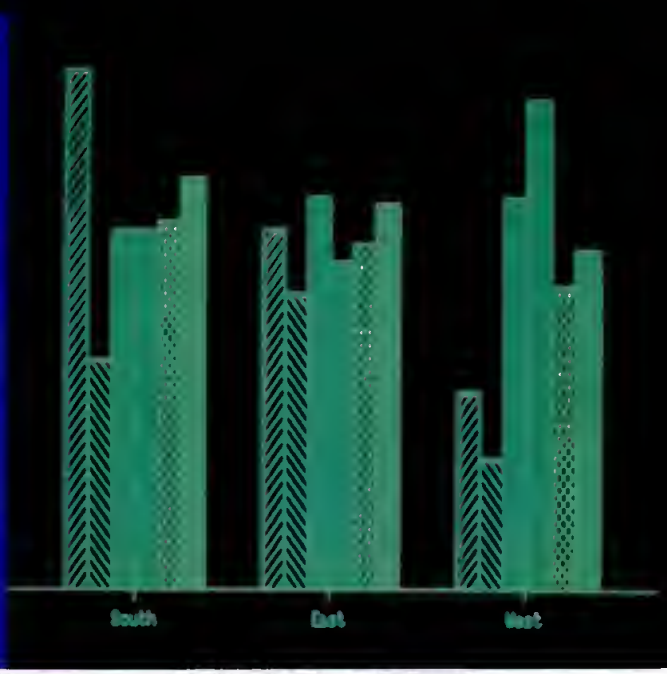


CGA Mode



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The Paradise AutoSwitch EGA Card. Just what you would expect from the Video

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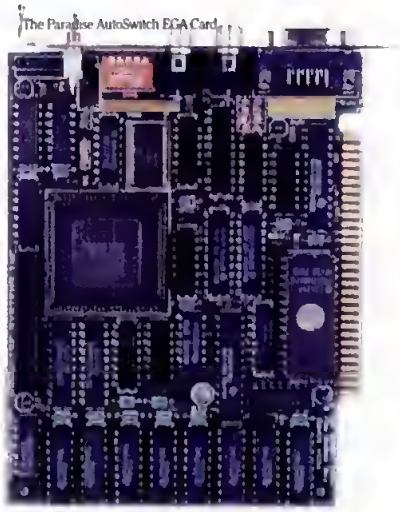

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CIRCLE 385 ON READER SERVICE CARD

PC MAGAZINE FACT FILE

Please
Hayes Microcomputer Products Inc.
5923 Peachtree Industrial Blvd., Norcross, GA 30092; (404) 449-8791
List Price: $349 **Requires:** 128K RAM, two disk drives, DOS 1.1 or later. **In Short:** A competent database manager that offers indexing, data import and export, database merging, database modification, and several report formats; in addition, its three levels of password protection safeguard your data. Not copy protected.

CIRCLE 698 ON READER SERVICE CARD

Please helps you design reports with a series of menus and tables.

You can also search for data in nonindexed fields, although that takes somewhat longer.

Please offers several report formats. The automatic tabular format arranges the data in rows and columns with desired totals and subtotals. You also have the option of specifying the exact position of each item on the page. And for "quick and dirty" reports, *Please* has a Quick List format, which allows you to create a report using just five typed commands. The program has no predefined label format, however. If you want to print mailing labels, you'll have to go through the regular report creation process.

Please utilities include most of the bread-and-butter functions of good database management software, including data import and export, database merging, and database modification.

Its manual and tutorial are complete and well organized, if somewhat heavy on technical jargon.

All in all, *Please* is a competent performer. It can manage your data capably and give your MIS manager one less reason to toss and turn at night.

—Dara Pearlman

POUNCE

Unlike the usual PC database package, *Pounce* is a separate database handler that operates in conjunction with user-written COBOL programs. You use *Pounce* to read, write, and sort your database files, employing standard COBOL language elements to specify your instructions.

Pounce organizes data in a manner similar to the Index Sequential Access Method (ISAM). You can access ISAM files sequentially or via match-on-key indexing. Most PC-based COBOL compilers already include an ISAM facility, and so the immediate question is, "Why *Pounce*?" The answer depends on your particular data-processing situation.

Unlike integrated ISAMs, *Pounce* requires you to define and index your database separately from your COBOL program. It also requires that you make a lot of decisions about your database before you index it.

Besides having a good idea of how many records (up to 65,000) you are likely to need, you must know the various ways you will want to access those records. The package supplies two utilities for accessing the records in your database.

FORMULATING THE INDEX The first utility, Dbdefine, formulates the index according to information you supply about the record length, file size, and search keys of the database. You can establish up to 32 index keys with Dbdefine, and each key can have up to three noncontiguous search fields. If you later need another index key, you can erase the old index file and redefine it, but this can become cumbersome if you already have several keys defined.

As a final courtesy, Dbdefine prints out the COBOL data items necessary for using the database. Instead of automatically creating a COBOL copy library element for each file you define, *Pounce* requires you to retype these items into the Working-Storage section of your program. Do so carefully because one mistake can clobber your index and /or file later on.

The second utility supplied with *Pounce*, Dbcreate, reads your database file and initializes its index. You perform this step even for files not yet created. Dbcreate reports how many reads of the index file *Pounce* will require to find a particular record via its primary key. You can use this report to gauge access efficiency and perhaps to rethink the key if it looks like a slow performer.

COBOL FRIENDLY Any COBOL programmer familiar with mainframe database packages will be instantly comfortable with *Pounce*. You use the aforementioned Working-Storage data items as arguments in standard CALL statements to the *Pounce* run-time module. Different run-time modules are supplied for most of the popular PC-based COBOL programs (I used the *Micro Focus* flavor for this article). To perform a *Pounce* function, you load a function code into the proper data item, optionally specify a key number and search argument, issue the CALL, and inspect the return code. The approximately 20 functions include reading, writing, updating, deleting, opening, closing, and (partially or completely) sorting your files.

Except for the WRITE function, *Pounce* doesn't change the physical location of your database records. Rather, it

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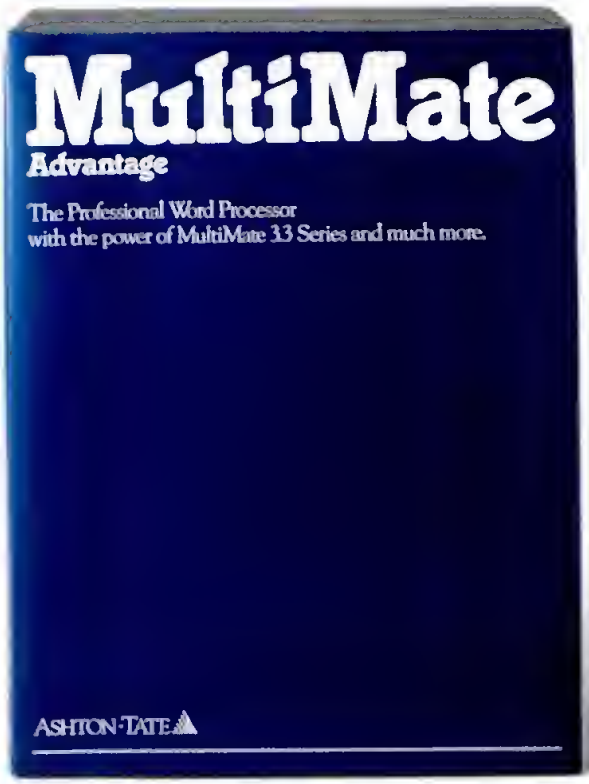

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CIRCLE 210 ON READER SERVICE CARD

PC MAGAZINE FACT FILE

***Pounce*, Version 1.2**
Chattahoochee Computer Products Inc.
2872 Woodcock Blvd.; Atlanta, GA 30341; (404) 457-6669
List Price: $495, single user; $1,495, network **Requires:** 256K RAM, one disk drive, DOS 2.0 or later. **In Short:** Essentially a utility program rather than a database package, *Pounce* lacks the customary goodies such as a query language, screen painter, and report generator; you use standard COBOL to instruct it to read, write, and sort your database. Not copy protected.

CIRCLE 699 ON READER SERVICE CARD

The Dbcreate utility initializes the index and reports the relative access efficiency of the primary key.

manipulates the file's indexes to perform its work.

Since it is essentially a utility program rather than a database package, *Pounce* lacks the customary goodies of the latter, such as a query language, a screen painter, and a report generator.

These functions must be coded in COBOL instead. It took me well over 3 hours to program the standard PC Magazine Labs report for Category 2 databases, and so you must consider the usefulness of *Pounce* and COBOL within the actual data processing context of your site. In a single-user environment, the extra steps involved in setting it up, as well as its $495 price, don't justify *Pounce*'s benefits.

However, if your computer site is a PC network that uses COBOL applications, you're a candidate to evaluate the question, "Why *Pounce*?"

The answer lies in the few things that *Pounce* does better than plain-vanilla (albeit free) ISAMs supplied with today's COBOL compilers.

PC NETWORKING *Pounce* allows a much larger number of different search keys to be applied to a file, and the keys need not be contiguous. This feature provides greater flexibility in accessing your files without resorting to relatively slower and costlier SORTs. *Pounce* is efficient in its space requirements for its indexes and is uniformly fast whatever the size of the database.

Pounce-controlled file-locking differs from DOS NET-BIOS in that it allows you to read a record already locked for update by someone else, a definite plus. Of course, simultaneous update is prohibited. One last positive note is that it should be far easier for your staff to port *Pounce* to different PC COBOL compilers than it is to port the somewhat compiler-specific ISAMs *Pounce* replaces.

On the downside, *Pounce* requires you to index and size your file before compilation and allows a maximum of only 65,000 records. Its error-handling procedures are not as robust as those of most ISAMs, especially when you've incorrectly specified a file's key size or record length. Overall, these reservations are minor and should not dissuade you from seriously considering *Pounce* as a DBMS adjunct to a PC COBOL network environment.

—Eric Bank

PRIVATE FILES

Private Files is a sporty little file handler that speeds through common file management tasks like a Maserati on a deserted racetrack. It achieves its speed and ease of handling by eliminating any excess baggage or heavyweight features. You get not only the basics with *Private Files*, but you also get the elegance of simplicity.

Private Files uses menus to guide you through all phases of data management, from database creation to report designing. If you get stuck, context-sensitive help is only a keystroke away.

CREATING AND INDEXING To create a database with *Private Files*, you simply type an input form on the screen, using function key–invoked commands to define the data fields. Choices are few and simple. You define the length of the field and specify whether the data item is floating-point numbers or text. If the field is numeric, you specify how many decimal places you need. Then you decide whether or not the field should be indexed.

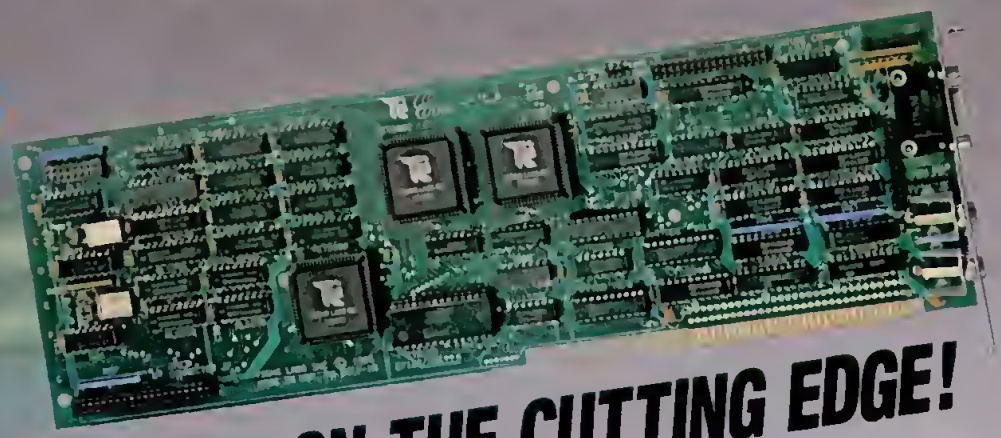
The indexing decision is more important than with most data managers because *Private Files* can only search indexed fields. So, if you think you'd like to check on employees in a certain salary range or look up customers who buy a certain product, be sure that you index the salary and product-name data fields.

You can specify up to 40 indexed fields in a file, and, although the manual warns you to be sparing in your use of indexes because they can slow down the performance, I didn't see much performance deterioration in the PC Magazine Labs tests using an IBM PC-XT. Using a 500-record file with seven indexes, record retrieval was almost instantaneous.

Private Files instantly reorders your database when you perform a search, using your search field as the primary sort key. For instance, if you search for an employee named Williams, your employee database appears in last-name order, allowing you to page through the alphabetically sorted records using the function keys. Thus, although you can search for data using only a single field, paging through all the records on employees named Williams takes only

INTRODUCING

Eva



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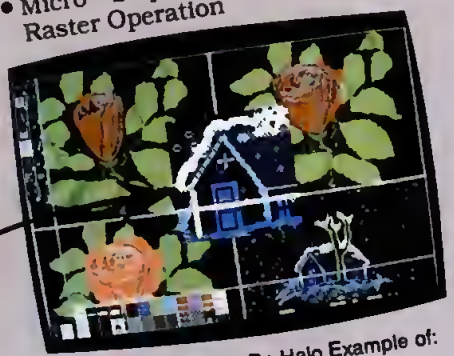
- Window Scroll and Pan
- Micro—Sequencer For Turbo Raster Operation



Media Cybernetics—Dr. Halo Example of: ET 2000 Hardware Zoom/Viewport

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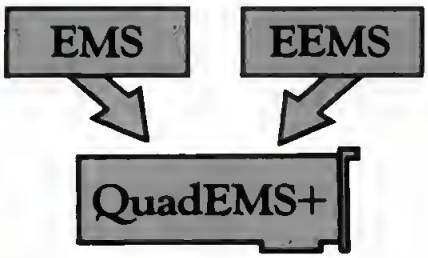

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QuadEMS+ delivers 2Mb RAM when you move up to expanded memory. And supports both expanded memory specifications: EMS and EEMS. Each is independently engineered into the board. Plus, there's a printer port, communications port, and clock/calendar to enhance your system.

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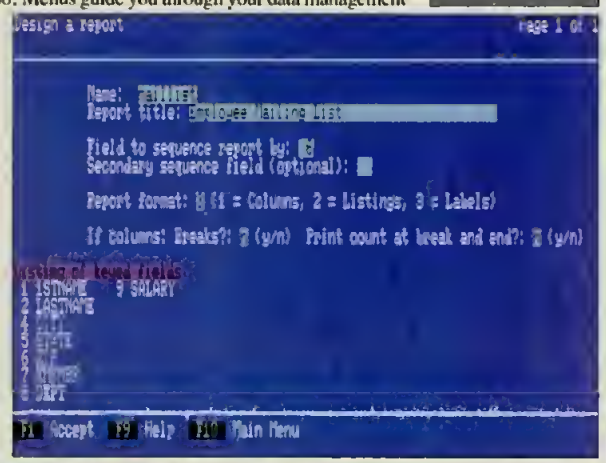
PC MAGAZINE FACT FILE

Private Files, Version 1.28
Sofistry Inc
5252 Thorntree, Irvine, CA 92715; (714) 474-1466
List Price: $188.95 **Requires:** 192K RAM, one disk drive, DOS 2.0 or later. **In Short:** Simple, plain, basic—this database manager is all that and fast and easy to handle, too. Menus guide you through your data management tasks. A supplementary program imports and exports data. Not copy protected.

CIRCLE 696 ON READER SERVICE CARD



Easy-to-follow menus lead you through the report creation process.

a few keystrokes.

If you need to search your file for an item that is not indexed, modifying the database is easy, but you will discover there is a penalty. When you change the file definition, you'll lose any report definitions that you've created.

THREE REPORT TYPES *Private Files* reports come in three types. You can do the common column-and-row-type listing, with the option of printing subtotals, totals, and averages. The program also has a quick mailing-label format and a format that allows you to list a block of data from each record.

Page numbers are automatic, and there are no user-defined headers or footers. Once you've created a report definition, including sort order and data selection criteria, you can save it on disk for later use.

Printer support is plain and basic. If you have an Epson-compatible printer, you can use condensed type. Otherwise, you get your printer's main font, with no embellishments.

A supplementary program called *Private Files Plus* allows you to import and export data in a number of popular formats. It also enables you to merge *Private Files* databases that use a common field. Thus, you can merge an employee address file with an employee salary file to create a report using salary and address information.

Private Files has made a virtue of simplicity. If your data management needs are modest, it's definitely worth considering.—**Dara Pearlman**

RANK AND FILE

Rank and File performs the expected range of personal database functions, and even first-timers can easily learn to use it. What sets *Rank and File* apart from the crowd, however, is its speed. You are able to browse through a database of full-screen records as fast as you can hit the PgDn or PgUp keys. Before your finger even leaves the key, all of the next or previous record appears.

Now, the bad news: *Rank and File* imports *nothing*. You can export files to your heart's delight from a menu of formats. But there is no way to bring data into the program without requesting (for free) a special file from *Rank and File*. If you don't have this file, you must enter data fresh, just as I did. I'm trying hard to mask my frustration, but *Rank and File* really missed the boat here. If the special file came on the program disk, I would have nominated the program as an Editor's Choice.

Rank and File boots to a main menu of ten self-explanatory choices assigned to the function keys, and each brings a submenu of options. If you've used a database program before, you'll run 90 percent of *Rank and File* without reference to the manual. However, when you *do* need to find out something, don't count on the manual's index—it has but 25 entries. Be prepared to thumb.

■ What sets *Rank and File* apart from the crowd is its speed. The complete record I requested appeared before my pinkie returned to its home-row position.

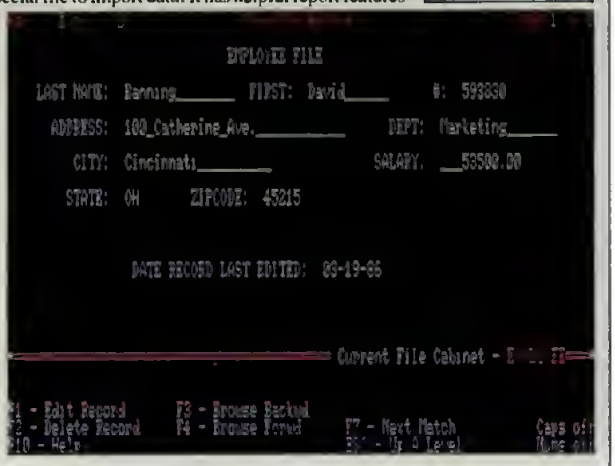
The design of database input/editing forms is flexible, allowing up to 250 fields per record on up to five separate screens. Redesign options are available for moving, renaming, adding, and deleting fields, and changing field types and lengths. Editing numeric or dollar fields is easy with the four-function calculator.

SPEEDY RECORD SEARCHING Record searching is *Rank and File*'s forte. Using the PC Magazine Labs test data I had keyed in, I was able to search records *instantaneously* through any field. For example, with an unsorted database, I typed in "Julie" in the First Name field, and the complete record for Julie Williams appeared before my pinkie had returned to its home-row position. I entered someone

FACT FILE

***Rank and File*, Version 2.0**
RAF Software Inc.
P.O. Box 32338; San Antonio, TX 78216; (512) 366-3633
List Price: $195 **Requires:** 128K RAM, one disk drive, DOS 1.1 or later.
In Short: Flexible, easy to use, and incredibly fast, this program could lead the pack if it didn't require a special file to import data. It has helpful report features and print options. Copy protected.

CIRCLE 689 ON READER SERVICE CARD



Searching with Rank and File *is both powerful and simple: position the cursor on a field, select a search symbol from the menu, and fill in the data value.*

else's salary and found his record just as quickly. You can do more-complex searches with *Rank and File*'s search symbols, which include equal, not equal, greater than, and so forth. Search strings with wildcards are available, along with what is called the "lazyman's" search. Say you need to find the record for John Schalachamicherra, but you can't spell the last name. Just enter 'Scha" and the program will quickly match all records. Simple, neat, and speedy.

Rank and File is helpful in creating reports, though you are restricted by its rules. A report has four sections: header, body, footer, and grand totals. One section at a time, the program prompts you to fill in your report specifications. The body of the report can contain running totals and calculated fields. A nifty Trim feature allows you to space a first and last name properly. The manual includes information on creating a mailing label report and one that addresses envelopes. Entering printer control codes is simple, and this gives you the ability to produce fancier-looking reports, a feature that every database program should have.

Another nice touch is a submenu of print options. Once you've defined or called up a report, you may use this menu to override its search and sort criteria, print to the screen, pause between pages, print multiple copies, print grand totals only, print a test pattern for paper alignment, and print with or without printer control codes.

Rank and File has much in its favor as a personal data manager, but without the special file for importing data, you can't take advantage of *Rank and File*'s incredible speed by pulling in chunks of data from slower programs.—**Phil Wiswell**

SUPER*LIST MANAGER

*Super*List Manager* is great news for those offices that prefer 3- by 5-inch card boxes to a program as complex as *dBASE*. This easy-to-learn program meets elemental sort/select, database, report, and mail-merge needs. Its menu-driven format and well-written manual cloak *Super*List* in simplicity.

For further help, *Super*List Manager* is shipped with a predefined database and

■ The honeymoon ends when you realize that *Super*List Manager*'s data field lengths and data field names are tamperproof and preset.

data loaded on its floppy disk. Although you can delete the practice data, the honeymoon ends with the realization that *Super*List Manager*'s 24 practice data field lengths and data field names are tamperproof and must be used in their preset form. Retaining information in other than the prescribed field names necessitates that it be squeezed into a two-character record selection field. This mixed blessing of simplicity and restriction underlies most aspects of *Super*List Manager*.

SIMPLE YET RESTRICTIVE Simplicity is the law in *Super*List Manager*'s data entry, updating, and storage operations. Data entry has two easily set features: the first lets you skip over any number of unused fields, and the second automatically repeats previously entered data. With one keystroke, you can clear the date field and the two monetary fields of all records. While you can add to or subtract from the monetary fields, you do so on a record-by-record basis.

Restrictions also rule in the data entry section. For instance, if you are adding 50 records, you have to confirm 49 times that you still wish to be in the data input mode. You cannot remove these "turn the page now" type prompts as your learning curve advances. Another detraction is that you can access records for change or deletion only by using the record number field.

*Super*List Manager* prints sorted data reports based on selections you make using simple relationships such as greater than (>) or less than (<), and equal to (=). Up to four such relationships can be combined using Boolean And/Or operators.

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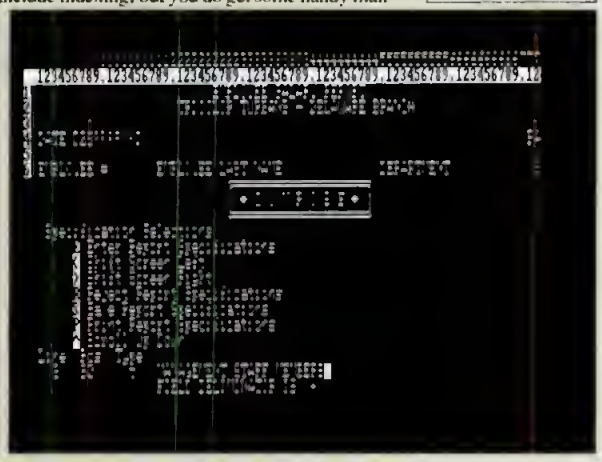
PC MAGAZINE FACT FILE

SUPER LIST MANAGER

***Super*List Manager*, Version 3.2**
Pinnacle Software Systems Inc.
P.O. Box 1220; Fort Collins, CO 80522; (303) 224-5061
List Price: $195 **Requires:** 256K RAM, one disk drive, DOS 2.0 or later.
In Short: A simple but restricted program for getting basic office jobs done; the limited database does not include indexing, but you do get some handy mail-merge and postcard addressing/writing features. Copy protected.

CIRCLE **692** ON READER SERVICE CARD



The report format for Super*List Manager. *Here the new text field Management Staff is being added to the third-row, 30th-column coordinate.*

While it was simple to list the data processing and marketing people in the PC Magazine Labs test database who had salaries between $15,000 and $40,000, it was impossible to sort by department name and then by salary within department because the *Super*List Manager* does not index fields. You create report formats by entering title and data markers in 9-row by 132-column coordinate positions. The program can store 15 different report formats at one time.

In addition to its database, *Super*List Manager* lets you create a 378-line document and interface it with selected records from your data file for mail-merge. This mini word processor has insert/delete line features and uses cursor keys, but has no word-wrap feature.

ADDITIONAL HIGHLIGHTS Other *Super*List Manager* highlights are its ability to transmit selected data fields to print postcard addresses and to build a text message on the flip postcard side. A format to create receiver and sender/receiver mailing labels is also included. A new feature converts *Super*List Manager* data records to ASCII format for output, but you cannot import data into *Super*List Manager*.

This package lacks the on-line help and escape keys with which newborn software indulges us. For instance, hitting the wrong key in this program is like missing your exit on the parkway and finding no U turns for 5 miles. Thus I constantly ended up at the DOS A> prompt.

Because *Super*List Manager*'s prompting and predefined data fields force concessions, the package will not be tolerated by most experienced PC users. However, if you want to put *Super*List Manager* to the use for which it was designed, you can create applications that can be a major accomplishment in this high-tech age.—**Nancy Trespasz**

SYMPHONY

Symphony from Lotus Development Corp. is an integrated software package that includes a fundamental database management component, as well as word processing, graphing, worksheet, and communications components.

The program's facilities are similar to those of *1-2-3*, where *Symphony* has its roots, but the program automates many of the tedious tasks required to create and maintain a database and dramatically increases forms entry support over that afforded by *1-2-3*.

As with *1-2-3*, the underlying structure for data is the row-and-column matrix of the spreadsheet. The number of records in a table is limited by the number of rows in the spreadsheet, which total 8,192, and the records may be further constrained by available system memory.

Version 1.1 of *Symphony* supports the Lotus/Intel/Microsoft Expanded Memory Specification, allowing you to take advantage of a greater storage capacity than that offered by the program Lotus Development Corp. released originally.

CREATING A DATABASE With *Symphony* you create a database by entering field names into a range of cells on a worksheet. As with the word processing, graphing, worksheet, and communications parts of *Symphony*, the Form window has its own menu.

The Generate command creates a one-record-per-screen entry form based on the assigned field names. Behind the scenes, it sets up several named ranges, the term *1-2-3* uses for rectangular groups of cells on the worksheet.

The ranges contain the raw data and the entry form. They also have the elements necessary to specify selection criteria and control the properties of the entry form. Any modifications to the data structure and entry form that you find necessary are made to these ranges using normal worksheet commands.

The "definition" range acts as a filter for data being entered in the entry form. *Symphony* can use the formulas you enter in it to check the validity of input, calculate a result, or generate a default value. The words used to prompt you and the display format of data on the form are also controlled here.

You can access a "criteria" range from the Sheet or the Form window. Formulas in cells restrict the database to records satisfying certain requirements. You can specify the criteria when you are printing or when you are either extracting or modifying data.

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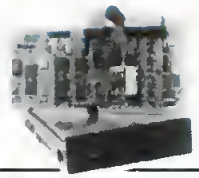

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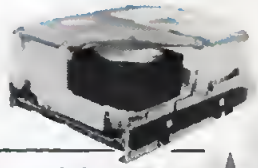

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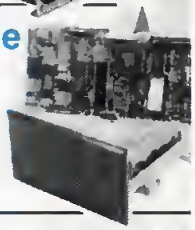

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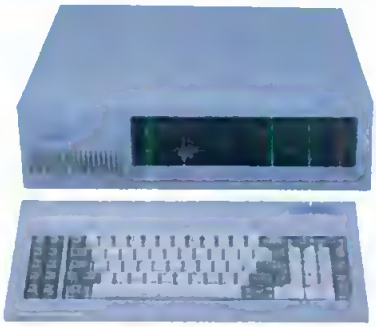

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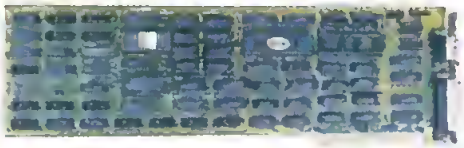

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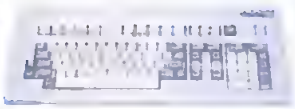

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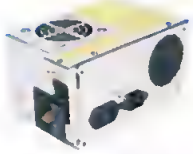

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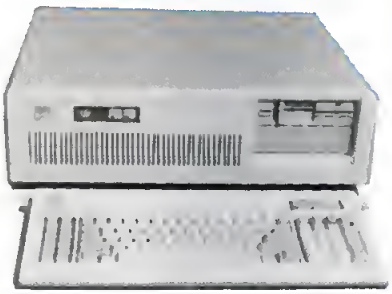

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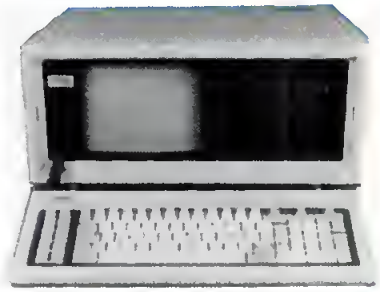

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PC MAGAZINE FACT FILE

***Symphony*, Version 1.1**
Lotus Development Corp.
55 Cambridge Pkwy.; Cambridge, MA 02142; (617) 577-8500
List Price: $695 **Requires:** 384K RAM, one disk drive, DOS 2.0 or later.
In Short: An integrated package with a database management component, as well as word processing, graphing, worksheet, and communications capabilities; it automates many of the tedious database management tasks and offers windowing and macro language tools. Copy protected.

CIRCLE 693 ON READER SERVICE CARD

The Symphony *Form window allows viewing and editing of the data on a one-record-per-screen basis.*

REPORTING ABILITIES *Symphony*'s reporting abilities are quite flexible; an understanding of *1-2-3* formulas and ranges is nevertheless useful. String functions are available to allow free-form as well as tabular report design.

The techniques for merging data with documents from *Symphony*'s word processor are an extension of those used to design reports. You generate a form letter by using string formulas in place of name and address information. The program prints the text of the letter, created with the word processor, once for every record in the database. Paragraphs will reformat automatically unless merged data is the last item on a line.

If your sole application is database management, *Symphony* may not be the perfect solution. But the Form window is a handy component of a program whose real strengths are in its worksheet, graphics, and communications.

The combination of these integrated functions, together with *Symphony*'s windowing and macro language tools, constitute a flexible, reliable environment for certain database needs.

—David Hoffman

T.I.M. IV

T.I.M. IV is the latest incarnation of *Total Information Management* from Innovative Software. The program acquired a broad user base when it was bundled with various PC-compatible machines. A powerful, top-of-the-line Category 1 database, *T.I.M. IV* has features and capabilities that straddle the fine line between flat-file and relational databases. While it's at the pinnacle of this category's performance in terms of muscle power, it lacks some modern cosmetic niceties. Written in BASIC, it is comprehensive but large, and its old-fashioned user interface tends to be cumbersome.

Little oddities in the program crop up constantly. For example, even though I specified drive C: as my default disk during installation, the program acted as though I'd chosen floppies, prompting me to insert one of the four disks. I had neglected to type Z, a one-time command that moves you on to the configuration program after the installation. Since I was never prompted to type Z and the instruction to do so gets only an obscure reference in the manual, it was an easy oversight. Also, *T.I.M. IV* guides you through three or four unnecessary question-and-answer steps before you are informed your tactics won't work—especially when accessing libraries for reports and lists and linking two data files.

■ *Symphony*'s Form window is a handy component of a program whose real strengths are in its worksheet, graphics, and communications.

The program is built on a simple main menu that lists 12 functions. You may jump between these functions without revisiting the main menu by typing "/menu command." (This feature makes *T.I.M. IV* more efficient than the many other databases that I call "Main Menu Revisited" types because of the frequency of mandatory return trips.) Following the main menu selections, *T.I.M. IV* prompts you with a straightforward, helpful series of questions and answers to act as a guide. Function keys, constantly displayed at the bottom of the screen, facilitate entering and editing data.

T.I.M. IV's screen workspace is large, and the prompts concerning data entry and manipulation are especially precise. *T.I.M. IV* allows for the specification of eight data types, including calculated fields, inverted fields, sequential fields, two types of date fields, and a "totals" field. A record is limited to two pages; so unlike many databases that allow for attached pages, *T.I.M. IV* was not meant for lengthy textual-type records.

TAILORING KEY FIELDS The greatest power of *T.I.M. IV* is in its simple but in-depth treatment of key field designations. When you create a key field, *T.I.M. IV* automatically sets up a stored sorted index for that field. *T.I.M. IV* allows you to cre-

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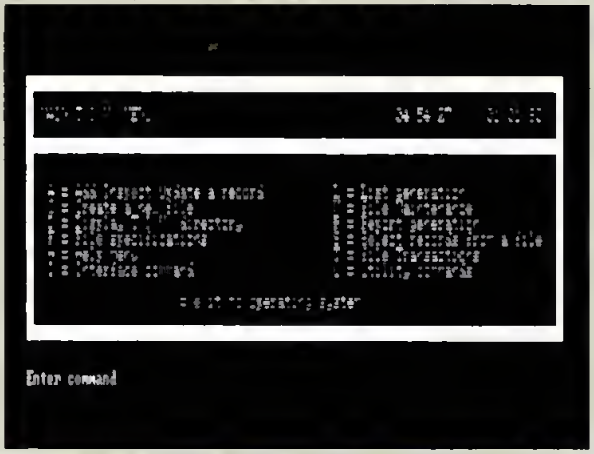
FACT FILE

T.I.M. IV, Version 4.0
Innovative Software Inc
9300 W. 110th St., #380; Overland Park, KS 66210; (913) 383-1089
List Price: $245 **Requires:** 128K RAM, two disk drives, DOS 1.0 or later.
In Short: Without a modern user interface, this database manager is somewhat of a throwback, but it gets the job done. It acquired a broad user base when bundled with PC-compatibles. Not copy protected.

CIRCLE 684 ON READER SERVICE CARD



Not flashy, but certainly comprehensive, the T.I.M. IV *main menu screen reflects the program's thoroughness.*

EDITOR'S CHOICE

Infoscope is a unique database that uses up to 12 individual "scopes" or windows to gather data from up to eight files into a separate activity area, allowing you to sort and filter information in a multitude of formats; it is incredibly quick and flexible.

Nutshell offers both ease of use and unusual versatility by including a text structure that allows users to easily alter their basic database layouts to accommodate reports, mailing labels, or even form letters.

If you prefer a more traditional product, ClearCut boasts both speed and an impressive report facility that supports data functions usually found in more-complex products.

ate minor fields to further tailor your data. These fields are, in effect, subsets within the key field, but they are based on other fields. So, for example, it was easy to tell *T.I.M. IV* to sort salaries within a given department during the PC Magazine Labs tests. You can define up to 16 minor key fields for a major key as long as the total length of the key fields does not exceed 80 columns. Too many minor keys may slow down search and retrieval procedures, though.

To create a new database file, you must fill in a specification chart defining the field types and lengths. Next you format these fields either by using *T.I.M. IV's* standard screen format or by defining and painting customized screens. Other appealing file creation features include the "Create a file similar to another file" option, which allows for quick modification.

T.I.M. IV's select criteria are sophisticated, but the language is not particularly congenial. You must precisely format parenthetical and grouped expressions, including commas, relational abbreviations, and parentheses. Once you master the format, the program handles any single-file search with ease.

■ *T.I.M. IV* uses the horse-and-plow approach to database management. But even though it's a bit of an anachronism, it gets the job done.

T.I.M. IV facilitates both list and report generation but handles them as two separate entities with very different screen-formatting schemes. The list format relies on a coordinate specification input chart, while the report feature is more of a question-and-answer affair. Report generation requires setting up titles and page specifications and then defining fields for inclusion. Reporting features include break fields and a number of averaging, totaling, and counting facilities.

Although *T.I.M. IV* allows you to link two different database files together, my only inexplicable *T.I.M. IV* event occurred as I tried to link two files during a report generation. I had already created a number of indexed fields on both of the data files I intended to link. Whenever I tried to link, the program crashed. Apparently, I had overtaxed the program. The report line on the linked format screen attempted to give me an idea of what I'd inadvertently specified to link, but the report file messages are especially cryptic. After setting up the link in its entirety (a multiscreen process), I'd run the report, and *T.I.M. IV* would crash. Eventually, I went back to my file maintenance menu and eliminated all mention of key fields. Simplifying the data this way worked, and *T.I.M. IV* generated my report without further ado.

T.I.M. IV uses the horse-and-plow approach to database management. Without a nifty user interface, some handy , macro capabilities, or fancy screen design, even the newest version is a bit of an anachronism. However, the program gets the job done and gets it done without aggravating the user. *T.I.M. IV* is not the wave of the future, but it offers thorough data management today.—**Robin Raskin**

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ONE YEAR LATER

PC MAGAZINE'S INTERACTIVE READER SERVICE

If you haven't checked our electronic bulletin board recently (or got discouraged trying), it's time to dial in again. We've gone from 2 lines to 18 and have learned more about bulletin boards than we have room to tell. It's been quite a year.

"Is there really an Interactive Reader Service at *PC Magazine*?" More than one of you have asked that question during the past year. And with good reason. Up to now, *PC Magazine*'s multipurpose electronic bulletin board has been hampered by its own success. The number of readers vying for access to the system kept leapfrogging our projections. The comments left by those who have successfully logged on to the service point up the frustration many have faced trying to penetrate the busy signals. For many, logging on became like winning the lottery: hoped for, wished for, fantasized about, but not really expected.

That was yesterday. Today *PC Magazine*'s Interactive Reader Service (IRS) has caught up with demand. We've enlarged the system's capacity to 18 telephone lines from the original 2. We've redesigned and expanded the IRS's capabilities, shrunk it into an efficient multiuser system, and streamlined the operation with RAMdisks. If you haven't checked in recently, we encourage you to do so. We think you'll be pleased by what you discover.

The system is impressively interactive: You can download utilities and listings featured in *PC Magazine*'s back-of-the-book Productivity pages, preview the editorial lineup for future issues, leave questions for the PC Advisor, or short submissions for User-To-User or Power User. You can influence the direction of the magazine with your own comments, compliments, and complaints. We download readers' remarks regularly and circulate them through the entire staff. Frequently, editors call readers to discuss their suggestions or questions, so don't forget to leave a telephone number. You can even change your subscription address, renew, or start a new subscription.

GOOD INTENTIONS It hasn't always been so. When Bill Machrone first conceived a *PC Magazine* bulletin board in early 1985, he envisioned an instantaneous communications conduit between the magazine's editors and readers. He reasoned that a bulletin board would free readers from the time-consuming burden of keying in assembly language and BASIC code listed in the Programming column of each issue, not to mention the hours many readers spend debugging their typos. The luxury of downloading a .COM or .EXE file instead of compiling source code would be an additional benefit for nonprogramming readers.

Machrone teamed up with technical editor Craig L. Stark to bring his vision to life. They installed the two phone lines and a PC XT running *RBBS (Remote Bulletin Board System)*, a full-featured public-domain package from the Washington D.C.-based Capitol PC Users Group. The concurrent operating system Multilink was installed so that each of the 1,200-bit-per-second Hayes modems could act as though it had its own dedicated operating system.

■ Editor Machrone first conceived the IRS as an instantaneous communications conduit between editors and readers.

Within a week after they set up the system, the lines connected to the IRS were running a 98 percent utilization rate on a 24-hour clock, crushing our puny usage projections—and this without much publicity. The immense and immediate popularity proved the biggest barrier to the IRS's success. By late summer 1985, upward of 9,000 unsuccessful calls a day were bouncing off the overworked telephone lines, an unknown percentage of them generated by users who put their PCs in autodial mode hoping to score a lucky connection. Only a few hundred were managing to squirm through.

The hardware was taking a continuous beating and occasionally failed. Inexplicable late-night system freezes left the telephone lines idle and ringing until morning. Nobody was sure whether *RBBS* or Multilink was to blame, and troubleshooting by using each in conjunction with other programs shed no light on the problem.

Later we discovered that the sheer volume of calls, coupled with a quirk of the Hayes Smartmodems, were at the root of the problem. They were set to answer the line after one ring, which came so quickly after the previous call that there wasn't enough time for the system software to issue internal reset commands. Consequently, an incoming call would connect, only to be disconnected by the software as it reset the modem. That modem line would then float in limbo until Stark came around early the next morning to reset it.

During the summer of 1985, we put our ears to the ground in search of a PC-based system that could juggle multiple users quickly without crashing. There weren't many systems adequate for our purposes. Because we were tied to a PC-based system, our problem was uncommon. Most systems that process large numbers of users are based on mainframes.

THE ASCOM IV SOLUTION By autumn, we had tested and discarded a bulky CP/M system. We added extra telephone lines to the *RBBS*-based IRS in November. About the same time we came across a company called Dynamic Microprocessor Associates in New York City. Lee Rautenberg, president of DMA, told us about his company's communications software, *ASCOM IV*. One of *ASCOM*'s undocumented features is a multitasking executive. Although it was written for polled input/output, it would allow multiple users on a single PC AT. *ASCOM*'s script language, with its powerful pseudoprogramming capability, became the chisel we used to sculpt the reborn system. We exchanged our XT for two ATs (we later increased to three) and added a multiple-port expansion board from Nashville-based Arnet, which handles six users on each AT.

Polled multiuser I/O is a time-slicing system that shares an AT's resources among multiple users in a kind of superfast lazy-susan setup. We ran the test system against the tide of callers and were pleased, but sending data a character at a time through six ports was suicidally slow. So we hired the DMA crew, headed by Rautenberg, to write us an interrupt-driven version of *ASCOM IV*.

Rautenberg explains how the interrupt-driven software solved our speed problems: "The serial ports interrupt the AT whenever they are ready to send another

STEP-BY-STEP XMODEM TRANSFERS

If you use one of the four communications packages we see most often on the Interactive Reader Service—*PC-TALK III*, *ASCOM IV*, *Smartcom II*, and *Crosstalk XVI*—the following instructions will show you how to download files via the error-free Xmodem protocol. In this example, we'll step you through the process of downloading the file called WAITASEC.COM, but you would apply the same process to any file you wanted to download.

Enter the commands described below only after choosing WAITASEC.COM, option 30 on the PROGCOM menu. After you input 30 or WAITASEC.COM, the IRS will display the words "Ready to transmit; Begin Receiving. . . . " This is your cue to return to your communications package and input the appropriate commands. When the transfer is completed, you'll be popped back to the main IRS menu.

Besides binary (.COM and .EXE) files, archived files have to be downloaded via Xmodem as well. Some files, such as our indexes to *PC Magazine*, are so large that to help readers avoid heinous telephone bills, we archived them (squished into a smaller space with a public-domain archive utility). After downloading the indexes, download ARC .COM and its accompanying .DOC file. Then unarchive the file by typing ARC X*.ARC. This will unsqueeze the files and make them useful.—**Christopher Johnston**

character to a caller. The moment the port receives that character, it releases the machine to its former task.

"It can take up to 8 milliseconds to send a single character. During that time, the machine normally sits idle, but the interrupt-driven software frees the processor to service somebody else. After all, an AT might execute thousands of instructions in that 8-millisecond waiting time."

The interrupt-driven IRS is a bit slower than it would be if the system were dedicated to only one user, but it's considerably faster than our old system.

NEW BUGS Initially, the interrupt-driven IRS was as unreliable as the original *RBBS*-based system, and we were afraid that we had been too quick to declare victory. The AT hard disks crashed several times, reinforcing for us the value of hard disk backup.

New communication problems between *ASCOM IV* and the Hayes modems caused "ring-no-answer" states to pop up again. We rediscovered every bug in the PC's 8250 serial communications chip and programmed around each.

A few readers who didn't understand that the IRS is run by computer were dial-

In PC-TALK III, *hit Alt-R and you'll see the phrase "Receive a file." followed by the prompt Specification:. Type WAITASEC.COM=X and hit Enter. The words "Holding for start" will appear on-screen, and the transfer will begin. When all the blocks are received, the wards "Receipt of file WAITASEC.COM terminated" will appear.*

In ASCOM IV, *hit F2 and choose Xmodem for the Protocol, choice number 1 under File Parameters in the configuration menu. Enter Alt-F4 to get the file-transfer mode, then F3 to receive the file. Type in WAITASEC.COM under Receive List:. Hit F2 to begin transfer. The words "Press CR" will signal the end of the transfer.*

In Crosstalk XVI, *hit the Esc key to return to the options menu. Input RX WAITASEC.COM (RX for receiving Xmodem), and the download will start. As your computer starts receiving WAITASEC.COM, a small menu will tell which blocks you're on, and whether or not any errors occurred during transmission. When the download is finished, you will be sent back to the main menu.*

With Smartcom II, *hit F1 to return to the menu, choose the error protocal option, number 4, press number 1 for errar-free. Type in WAITASEC.COM, press Return. When the download is completed, press Esc. Make sure Xmodem is defined in the* Smartcom II *parameter's screen as Error-Free Protocol because Hayes sets the error-free protocol default to its own protocol in the factory.*

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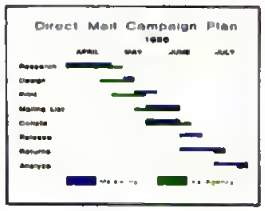

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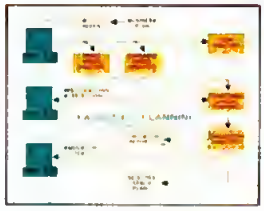

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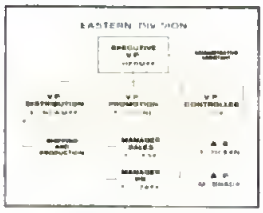

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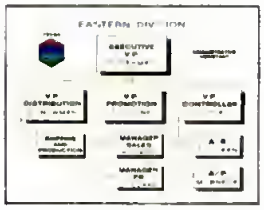

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CIRCLE 221 ON READER SERVICE CARD

ing on voice lines instead of data lines. Perhaps they expected some poor soul here at the magazine to answer and recite a few lines of code for them. Those of you who aren't familiar with the workings of data transmission might want to read up on it. (See PC Lab Notes, *PC Magazine*, Volume 5 Numbers 8 and 9.)

We discovered this problem because of

ELECTRONIC BULLETIN BOARDS: NOT JUST A FORUM FOR FREEWARE

Corporations, universities, and special-interest groups nationwide are using bulletin board software to exchange vital information, electronic mail, tips, and notices.

Electronic bulletin boards have been around almost as long as microcomputers. When the first enthusiasts began pushing the limits of their personal computers, bulletin boards were developed so they could post messages to one another, creating technical communities.

Enhanced through the years with sophisticated file-transfer capabilities, special security options, and other features, bulletin boards are more than just a way to receive free software. Many offer special-interest groups, businesses, and educational institutions a cost-effective method of exchanging information.

PC Magazine's Interactive Reader Service is just one example of a bulletin board application. Coopers & Lybrand, General Mills, Bankers Life, and even NASA use bulletin boards to communicate with their employees. Companies set up bulletin boards to keep employees in the field up to date. Home offices and field staffs can tap strategic data during an important closing, expedite and confirm contracts, and conduct other activities. In industries in which timing is crucial and written confirmation necessary, bulletin boards can boost sales, profits, and morale.

Bulletin boards are also used as internal mail systems throughout entire corporate structures. Although each bulletin board program handles security functions differently, businesses can configure systems so that certain individuals or departments have access to just the information they're entitled to know using limit functions such as read-only or write-only. A few corporations use bulletin boards to provide internal on-line computer support for new PC users. Answers to common questions can be left on-line for others to read. Bulletin boards are a particularly effective way for companies to assimilate and share information, ideas, and experiences among their staffs and to connect geographically separated employees.

For educational institutions, bulletin boards serve several purposes. The state of California uses *TBBS* to coordinate its regional educational centers. The University of Illinois customized *Colossus* to create a forum for professors to "chat" with their peers. On other institutions' boards, students can talk with their professors or with students and professors in other schools.

Special-interest groups use bulletin boards as newsletters and resource centers. The medical community used a *TBBS* bulletin board system to consult and discuss the controversial "Baby Fay" case in which a child received a baboon's heart as a transplant.

USER-SUPPORTED PROGRAMS If you're interested in setting up a bulletin board of your own, several programs are available. User-supported and user-enhanced *RBBS-PC* (*Remote Bulletin Board System for the IBM Personal Computer*) is widely used and considered by many to be an industry standard. Tom Mack, the author of *RBBS-PC*, states in the documentation that the program's two fundamental purposes are to serve as a catalyst for the free exchange of information and to serve as an educational example of what can be done with BASIC.

RBBS-PC has been enhanced and maintained by programmers and other users. Mack provides no formal support; if you have a problem with *RBBS-PC*, you must reread the documentation, ask other sysops (system operators) for advice, and figure it out yourself.

RBBS-PC includes security features that make it suitable for business use. Besides multilevel password security and a range of standard features, some of *RBBS-PC*'s interesting features include batch files that let users exit to databases or to DOS, wordwrap in the "chat" mode, and a way for up to 36 users with their own copies of *RBBS-PC* to share the same files in a network environment.

FidoNet is another popular public-domain system. To the standard bulletin board features like uploading and downloading, *FidoNet* has added networking capability. A *FidoNet* sysop is part of a community—approximately 700 *FidoNet* bulletin boards can call each other up and exchange information. Businesses can effectively operate a *FidoNet* between offices.

Colossus is a relatively new user-supported program similar to *RBBS-PC*. Its author is John Friel, who also developed *Qmodem*. Written in Turbo Pascal, *Colossus* offers good response and turnaround time. Available with a self-addressed, stamped disk or $5, *Colossus* is compatible with *FidoNet* and includes all the standard bulletin board features.

COMMERCIAL PROGRAMS Micro-Systems Software's adaptable and sophisticated *BBS-PC* is a business-oriented commercial electronic bulletin board program that can store vital statistics

an especially irritating IRS bug. When the two ATs answered our telephones but got no response to their modem's carrier tone, our ATs still had a disconnect command clogging their buffers. As a result, the unfortunate next caller was disconnected as soon as he got on-line. Rautenberg tackled that problem and many others like it and worked his magic.

from each regular user. Many Fortune 500 companies have taken advantage of *BBS-PC*'s ability to be configured to suit specific needs. *BBS-PC* features multilevel security, open- and closed-mode operation, time clock protection, instant carrier loss recovery, and 9 a.m. to 5 p.m. technical support. *BBS-PC* is fast: it supports 1,200 or 2,400 bits per second.

One of the first commercial packages, e-Soft's *TBBS* is a business-oriented program with a large user base. In addition to basic bulletin board functions, up to 25 separate message sections, and 24-hour technical support, the package has a menu editor so that different users can be allowed access to separate levels.

ProtoSoft's *IDEA-TREE* boasts easy installation and a DOS interface that allows you to execute other programs or commands from inside the bulletin board. This system groups messages into logical topics that act like separate bulletin boards. The topics contain files that can be uploaded or downloaded, and any activity in one topic is completely separate from another topic. *IDEA-TREE* also has secret topics that allow a group to exchange information without giving the general public access to their messages.

FoReM PC by Commnet Systems includes a separate electronic-mail system and the capability to search for strings within a function. A user can enter any of 99 different databases or collections of text files that the sysop can place in the database. Privileged users can upload text files to this database. A "Password Validation Mask" that comprises over 300 individual items (privileges, limits, quotas) may be set in a user's password. Since it would be extremely time-consuming for sysops to set up complex passwords for each individual, they can define user types and set class restrictions.—**Christina Dyar**

PC MAGAZINE FACT FILE

***Remote Bulletin Board System for the IBM Personal Computer (RBBS-PC)*, Version CPC13.1**
Capital PC User Group
P.O. Box 3189
Gaithersburg, MD 20878
List Price: $8 registration fee
Requires: 192K RAM, two double-sided disk drives, 80-column monitor, asynchronous communications adapter (serial port), Hayes Smartmodem or compatible, voice-grade telephone connection for modem, 25-pin RS-232C modem cable, DOS 2.0 or later.
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TBBS
e-Soft
4100 S. Parker Rd., #305
Aurora, CO 80014
(303) 699-6565
List Price: $299.95
Requires: 128K RAM, two disk drives (hard disk recommended), serial port, DOS 2.0 or later, clock/calendar chip recommended.
CIRCLE 642 ON READER SERVICE CARD

***BBS-PC*, Version 3.04**
Micro-Systems Software
4301-18 Oak Circle
Boca Raton, FL 33431
(800) 327-8724
(305) 391-5033
List Price: $149; enhanced version, $249
Requires: 128K RAM, one disk drive (two disk drives or hard disk recommended).
CIRCLE 643 ON READER SERVICE CARD

FidoNet
Fido Software
2269 Market St.
San Francisco, CA 94111
List Price: $100 for disks and documentation; $35 for just documentation
Requires: 256K RAM, two disk drives (hard disk recommended), serial port, DOS 2.0 or later.
CIRCLE 645 ON READER SERVICE CARD

IDEA-TREE
ProtoSoft
P.O. Box 16756
Seattle, WA 98116
(206) 932-5310
List Price: $89
Requires: 128K RAM, two disk drives, modem, serial interface card, DOS 2.0 or later.
CIRCLE 641 ON READER SERVICE CARD

FoReM PC
Commnet Systems
7348 Green Oak Terr.
Lanham, MD 20706
(301) 552-2517
List Price: $99.95
Requires: 384K RAM, two disk drives (hard disk recommended) auto-answer modem that uses DTR control line, DOS 2.0 or later.
CIRCLE 645 ON READER SERVICE CARD

Colossus
Forbin Project
715 Walnut St.
Cedar Falls, IA 50613
List Price: Self-addressed, stamped disk or $5
Requires: DOS.
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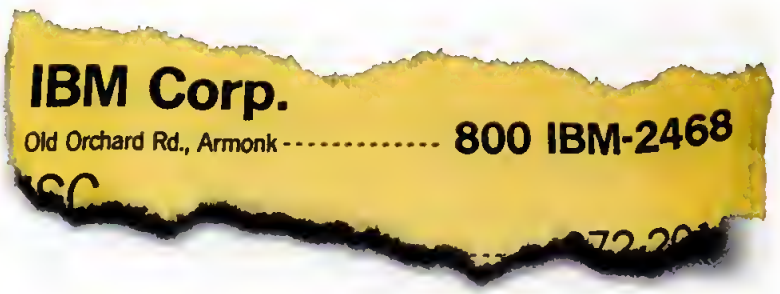

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call the numb

of 3X communications, er on the right.

When you want to connect your IBM PC to your System 34/36/38, whom should you call?

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Now call the people on the left, and you can emulate some terminals, a limited number of system printers, and not all of the 5250 display attributes. Of course you'll be able to work with IBM file transfers, but once the goods are delivered, can you work with virtually no support of PC based products?

So before you call the number on the left by force of habit, consider who's really giving you the best solutions in 3X communications. And ask yourself this.

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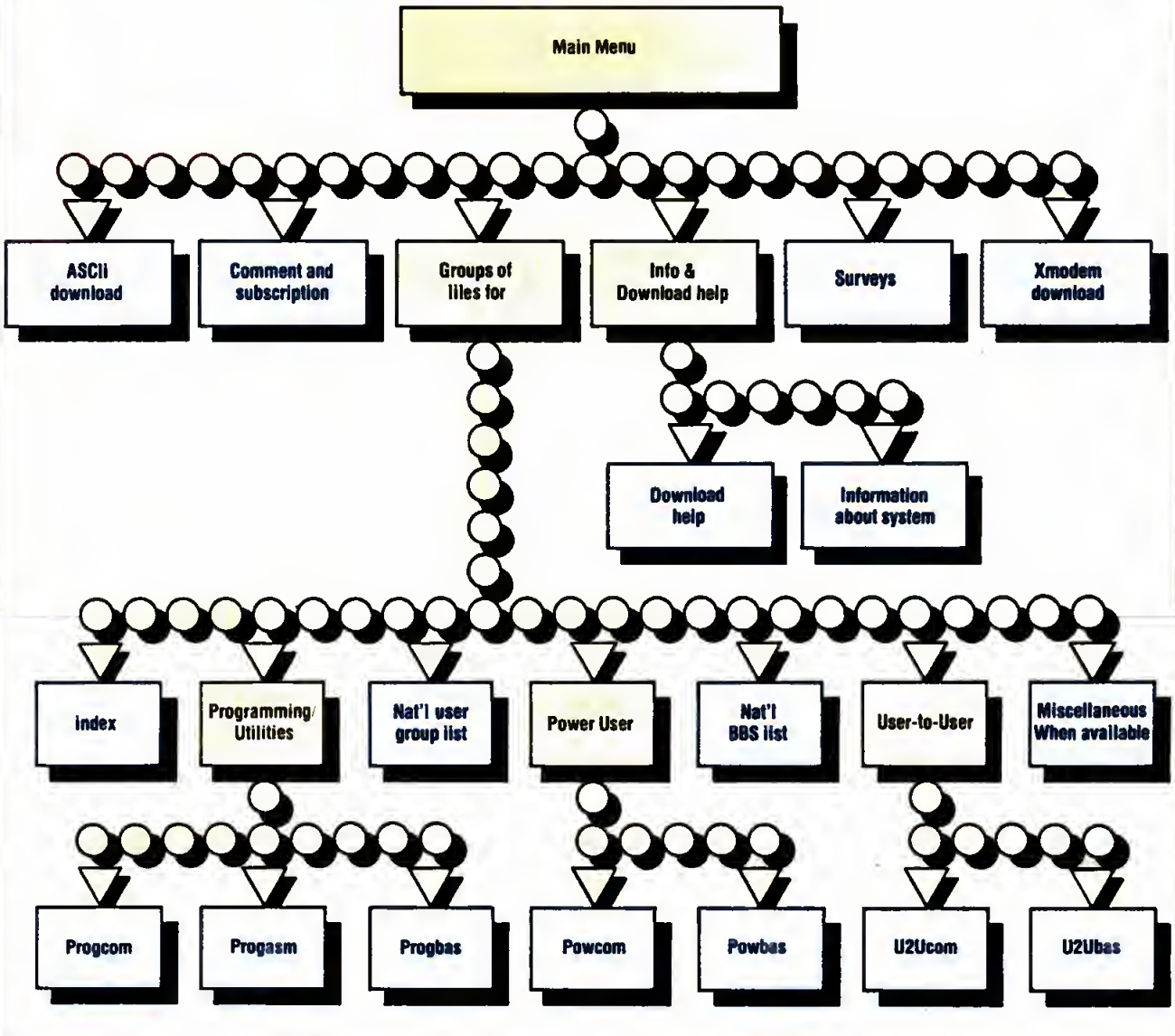
CIRCLE 359 ON READER SERVICE CARD

Navigating Through the Interactive Reader Service

We've laid out the IRS to make it easily accessible. The Programming/Utilities submenu is divided into three further submenus, each holding one of the three types of files: BASIC listings, assembly language listings, and compiled versions.

Some utilities don't exist in all three forms; if a version is not listed, it is not available.

If you go straight to the ASCII or Xmodem download facility without choosing a group of files, you're given the choice of available groups at that point.



Today, a jumble of cables and phone lines ties the IRS to the outside world via 18 racked Hayes Smartmodem 1200s. Each AT packs an Arnet board with eight extra ports to handle your calls. Three ATs handle six callers each; although we had room for eight, we decided to play it safe. We added an 8-MHz crystal to each AT to boost speed from the hardware end.

INSIDE IRS This IRS treasure chest resides on a 20-megabyte hard drive in each AT, accessed through a three-tiered menuing system. The top level gives you a choice of ASCII or Xmodem protocol for downloads, a group-choice menu for choosing files to download, an information facility full of help files, a comment and subscription service, and a survey submenu.

In the Groups submenu, files available for downloading fall into several categories. Programming, User-to-User, Power User, and Miscellaneous Utilities are divided into three groups each: one containing executable versions and two more with BASIC and assembly language listings of the same programs. An index to *PC Magazine*, a listing of user groups, and a listing of national bulletin boards are each designated as a group as well.

The list of bulletin board systems was downloaded from dozens of boards around the nation and is subdivided into smaller files by area code. Sysops who want to add their systems to our national list should leave a message for the PC IRS sysop in the comment facility, along with the name, telephone number, range of bps rates, and special focus of the BBS. Readers who want to correct the list should leave a message with the new information. Given the great number of BBSs in our list and the high mortality of BBSs in general, users who discover that a system is no longer in service are doing everyone a favor by letting us know via the comment facility.

Hierarchical menus like the ones on the IRS are common, but few are as simple. To simplify things even further, we decided not to support electronic mail between callers or to recognize a user-specific identification. Some smaller boards offer this option but are also more difficult to learn. We think it's far more important for readers to get at the files they want than to leave messages for one another.

The IRS's bells and whistles department includes "expert" and "more" modes. In the more mode, as in the DOS more mode, the display pauses with the word "more" at the bottom of the screen and waits for the user's signal to continue, instead of scrolling unchecked.

Many savvy bulletin board users turn on their communication software's printer option as they go through the menus, then switch to expert mode. The expert mode offers you one-letter abbreviations of the entries menuing system available in novice mode. Some users find the long menus a blessing, and others find them a costly pain. The expert mode lets you speed things up, once you're familiar with the IRS, by making your menu choices from these semimnemonic letters. For instance, C stands for Comment. This shorthand style makes it possible to dial, download, and drop the line inside of 5 minutes.

■ A jumble of cables and phone lines ties the Interactive Reader Service to the outside world via 18 racked Hayes Smartmodem 1200s.

Experts with bad memories can choose the question mark (?) to invoke a description of the cryptic letters. If you want to forego your expert status halfway through a session, you can toggle in and out of the menu mode by pressing the M key.

A TELECOMMUNICATIONS TUTORIAL In a typical IRS session, before dialing the IRS number, you should check the parameters in your telecommunications package to make sure they're correct: 8 data bits, 1 stop bit, and no parity. Your error-checking protocol default should be set to Xmodem.

Now enter your package and dial the IRS phone number: (212) 696-0360. When you are connected, you'll see the

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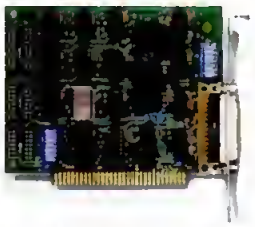

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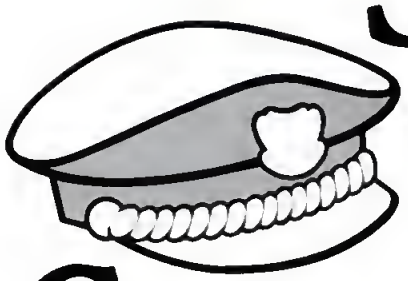

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■ PC-IRS

words "Press any key to begin. . . ." Tap a key, and a screen full of IRS salutation scrolls past. Note that you are allowed a maximum of 20 minutes on the system; you don't have to keep track of how much time you have left, since a timer scrolls by with each menu.

After inputting data about yourself, you'll be asked whether you want (n)ovice or (e)xpert mode; the first time you call, you would be wise to choose novice. Figure 1 shows the choices that will now appear on your screen. If you enter G at the prompt at the bottom, you will invoke a submenu full of groups of files, part of which is shown in Figure 2.

Say you want to download some assembly language listings from the Programming column. You enter 3 or the word "progasm," for Programming column assembly language listings, and the IRS sends you back to its main menu. If you later want to download files from other groups, you can always come back for more. Now choose A from the main menu, and you'll be shown the list of Programming utilities available as assembly language listings. You might choose SWEEP.ASM (a popular utility that runs DOS commands through every directory on hard disk, one right after another); to select it you can enter either SWEEP.ASM or the menu number next to it. The words "Hit the Enter key to begin downloading" will pop up on your screen. Now you return to your communications package and enter the commands to begin the ASCII download. After initiating the file capture, name the file, and then hit Return twice—once to let the program know you're beginning the download and once to tell the IRS to send the file.

The SWEEP assembly language listing will scroll over your screen, as if you had used the DOS TYPE command with the file on your PC at home. After the last part of the listing passes by, the words "Press a key to continue . . ." appear, signaling that the file has been sent. Send the appropriate command to mark the end of the ASCII download, which closes the disk-captured file. Later, after you have logged off the system, you can edit extraneous elements out of the file, run the clean listing through an assembly language compiler, and have an executable version of the file.

At this point, you might want to either download more Programming assembly language listings or return to the Groups submenu to pick another group of files. The system for choosing a group of files to download before you enter the ASCII or Xmodem download facility might be confusing at first, but there's a reason. We want our expert mode to be truly expert, so that those familiar with the IRS won't have to spend money unnecessarily on long phone calls.

EXPERT SYSTEM FOR ASCII DOWNLOADS Once you're familiar with the IRS, you can choose expert mode, download SWEEP.ASM with only four quick commands, and be on and off the system in a snap. After logging on, you choose expert and input the letter A to get to the ASCII download facility. At that point, you are prompted for a group name. Next you're asked for a filename *without the list of the Programming assembly language files*. Knowing you want SWEEP.ASM, you input the name of the file and the downloading process, identical to that described above, begins.

XMODEM DOWNLOADS Xmodem downloads are just as easy as ASCII downloads; the process is the same as above, but you choose the Xmodem (X) option instead of the ASCII (A). Keep in mind that although files downloaded via Xmodem are clean (since Xmodem is an error-checking protocol), the download takes longer and consequently costs more. Executable files (.EXE and .COM) on the IRS can only be downloaded with Xmodem; an ASCII attempt would only send gibberish across your screen at home. (See sidebar, "Step-by-Step Xmodem Transfers".)

If, before logging off, you want to leave a system-related question or opinion for the sysop, a submission to the Letters to PC Magazine column, or a subscription renewal, type C to drop into the comment facility. When you've used as many of the 20 available lines as you want, type END on a line by itself.

If you're happy with your catch at this point, choose Q from the main menu, and you will be logged off automatically with the goodbye message: "Thanks for calling the Interactive Reader Service."

FUTURE SHOCK And to those of you with acoustic couplers who have been tiring your fingers dialing the IRS, or those of you who jumped out of bed at 3 a.m. because your autodialer signaled a connection after 4 hours of trying, thank you for your patience. Despite all the development problems we've encountered, we know from your comments that we're on the right track. PC

You have the choice at the main menu of either going stroight to groups of files or choosing whether to download vio Xmodem or ASCII. If you choose Xmodem or ASCII, you'll then be given o choice of file groups.

This submenu has different groups of downloadable files. Iuput the letter of the list you wont to see. Whenever you're finished, go back into the Groups submenu and choose another group, then go back to either the ASCII or Xmodem menu.

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POWER ADD-ONS FOR dBASE

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Ashton-Tate's *dBASE* family is the unquestioned market leader in microcomputer database management software. Once *dBASE* attained this lofty status, third-party software developers, knowing that a huge market was already in place, could justify the investment of time and money to develop support programs that expand and enhance its capabilities. This expanding base of auxiliary programs has helped make *dBASE* even more attractive when it's compared with programs that don't enjoy this outside support.

A tremendous range of powerful and convenient utilities is available for *dBASE* users that add new features, improve existing ones, simplify complex operations—in short, make an already strong database management system even better. They fall into a number of distinct categories.

Screen generators, as their name implies, are programs that create *dBASE* screens. Defining screens is one of the most tedious aspects of *dBASE* programming, and these utilities can save both your time and your sanity. Some such programs create only format files for you to incorporate in your code, while others produce complete screen-oriented program modules. Still others use some form of machine language interface to "pop" the screens onto your display faster and to improve the quality of the presentation.

Report generators perform similar functions for the output end of the spectrum. The report generator supplied with *dBASE* is weak (even the improved version in *dBASE III Plus* isn't all that powerful), and third-party programs that fulfill this function are quite useful. Like screen generators, some create normal *dBASE* code while others establish their own environments and use *dBASE* data as input.

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CIRCLE 390 ON READER SERVICE CARD

PROGRAM GENERATORS Program generators incorporate both screen and report generation but take these concepts one step further and create entire program suites based on your description of what you want the database application to do. Some are designed for relative beginners who don't know the *dBASE* programming language, while others try to shorten program development time for experienced *dBASE* programmers by performing the more tedious and mechanical aspects of development.

You have several choices if you need to create business charts from *dBASE* data. *dBASE* makes it easy to export your data in standard formats that can be read by the many graphics packages on the market, or you can use one of the specialized programs designed to work directly with *dBASE* data files.

EDITORS All versions of *dBASE* come with a simple text editor that you can use to write your *dBASE* programs. It's adequate for short programs, but far from powerful or complete. *dBASE III* and *dBASE III Plus* let you specify an external editor to use instead. Almost any editor or word processor will work, but there are some editors designed for program development that are especially appropriate. The newest wrinkle is context-sensitive, "intelligent" editors that understand some aspects of *dBASE* and simplify your programming efforts by automatically indenting your code, interfacing directly with *dBASE* or one of the *dBASE* compilers, and much more.

Programming in *dBASE* can be tedious, especially without the debugging tools available in many other high-level languages. *dBASE III Plus* has been improved in this area, but none of the *dBASE* programs is particularly strong here. Some of the clones and compilers add useful debugging tools, but some third-party programs make your life easier by diagraming program flow, preparing lists of variables and where they appear, checking for errors, and so forth.

Some utilities can't be quite so neatly categorized. Literally dozens of them exist, performing functions as diverse as speeding up normal *dBASE* operations in one way or another, printing bar codes, and adding windows and other advanced interface techniques. As always, you have to separate the chaff from the wheat; not all add-ons are of professional quality.

PC Magazine assembled a representative cross section of new products from all these categories to give you a good idea of the types of programs available to you. We didn't look at everything; many fine programs are not included here. Whatever products you select, adding utilities to *dBASE* can make you more productive. And that, after all, is what good software is all about.

Genifer

Genifer is a program generator that produces complete applications coded in *dBASE III*. Bytel Corp., developer of the well-regarded COGEN COBOL program generator, has built on its experience to create what may well be the best *dBASE* code generator available.

The package includes, as a tutorial, a complete application developed under *Genifer*. It has an attractive segmented screen display of records from multiple files (aptly called Zoom). One aspect of the sample system is poor: a filter is used to narrow the range of reports, but the operator is supposed to recognize, edit, or enter a *dBASE III* conditional statement, a skill few operators should be expected to have.

Genifer maintains a data dictionary with information about the files and records used in your database and displays

PC MAGAZINE FACT FILE

Genifer
Bytel Corp.
1029 Solano Ave.
Berkeley, CA 94706
(415) 527-1157
List Price: $395
Requires: 256K RAM, two disk drives, DOS 2.0 or later. Hard disk recommended with 512K RAM.
In Short: A powerful program generator that creates flexible applications and produces high-quality *dBASE III* code. Not copy protected.

CIRCLE 622 ON READER SERVICE CARD

this information on elegant screens. You can specify default values for fields, validate user input against a range of minimum and maximum values, list the values that you will accept, or even validate input against a field in another database. You can also specify a standard *dBASE III* picture template when you define the field. The only problem with some of these possibilities is that you have to know the appropriate *dBASE* expressions, template codes, alias mechanisms, and so forth. Unlike some other *dBASE* program generators that purport to allow you to create applications without knowing *dBASE*, *Genifer* assumes that you are simply using the generator as a shortcut.

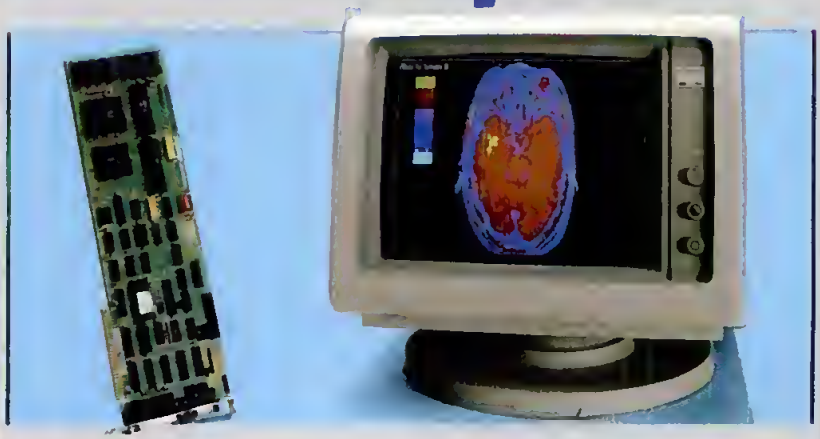
Genifer can be used with your normal text editor or word processor. A clever scheme integrates the two: providing you have enough memory, *Genifer* adds its capabilities to your editor screen.

The *Genifer* report writer is excellent. You simply paint fields and text in position. A simple and easy-to-understand mechanism establishes a given line as part of a page header or footer, a break before or after a user-specified field value, and changes or detail lines that appear for every record.

The documentation is generally good, with only a few minor "gotchas" in the detailed tutorial. A section on tips for advanced programmers reveals that *Genifer* includes a complete password scheme that you can add to your applications. It also provides complete information on the file structures *Genifer* uses.

The real proof of the pudding with any program generator is the quality of the *dBASE* code it creates. Several factors allow you to judge how good code is. Are meaningful and understandable variable names used? Is the code commented? Is indentation used? How well structured is the code—are procedures used, is parameter passing used, and so forth? *Genifer* produces good code. Bytel's background with COBOL program generation imparts a professionalism to its *dBASE* code that's impressive. If you are a serious *dBASE* programmer, you will be able to modify *Genifer*'s code with a minimum of study. The code is complex, which only goes to reinforce my feeling that *Genifer* is not best suited for tyros.

The Only EGA



A fully compatible 256k EGA card with a parallel port for only $259. If you buy any display card: Color, Monochrome, Hercules, or EGA, without reading this ad, you're probably throwing away a lot of money.

BT/EGA Enhanced Graphics Adapter: 256k of memory, and parallel printer port. Works with all standard IBM displays, and compatible displays
5150 Monochrome Display: Both text and 640x350 bit mapped graphics.
5153 Color Display: 640x200 and 320x200
5154 Enhanced Display: Color 640x350 16 simultaneous colors from a palette of 64

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This really is the only display board you may ever need. Regardless of what monitor you buy today, this card is a clear upgrade path for the future, and the best choice today, even if you are only going to use a Monochrome Display. This means one board today does monochrome 640x350 bit mapped graphics and text, and provides a clear upgrade path to 640x350 Enhanced Color Display with no change of display board. It also runs with the 640x200, 320x200 Color Display.

Killer Features

All boards come with a full 256k of memory, and a parallel printer port. That means no extras for later, and 16 simultaneous colors displayed from a palette of 64 colors, and crisp clear text on both Monochrome and Enhanced Color Displays - features or options that are not available on other EGA boards. Since all your current software will run, you're set for today, and prepared for the standard of the future.

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Of course many of you will want to take advantage of the EGA card right away, so we are offering a special deal when you buy the board together with a Basic Time HR 31-350 monitor - you get both for just $749, or the card only for $259. This means that you can equip all your PC's now and in the future with displays and EGA cards and get the Qubie' "No Risk Guarantee", our one year warranty, and 48 hour turnaround on warranty repairs. The price is the whole price, there are no extras for fraight, insurance, or credit cards.

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The code *Genifer* creates is solid and well constructed and incorporates useful ideas. If you're anything short of a *dBASE* genius, *Genifer* can save you time and more than pay its way.

Brief/dBrief

dBASE and most of its clones include a text editor to write programs with. The standard *dBASE* editor, a simple derivative of *WordStar*, is little more than adequate. *dBASE III* and *dBASE III Plus* also allow you to use any editor you choose for editing program files or working with memo fields.

Brief is one of the favorites of serious programmers in *dBASE* and other high-level languages. *Brief* is simple to learn and use and extremely sophisticated. You can edit multiple files and find and change text in much more powerful ways than with most editors. But perhaps the most impressive aspect of *Brief* is its rich macro language that lets you add features to the editor and/or customize the way it works. The macro language is complex, but it can do wonderful things.

One such wonderful thing is a package called *dBrief* that piggybacks on the *Brief* editor. *dBrief* is basically a set of macros that implements a simply marvelous operating environment for serious *dBASE* programmers. It acts as the central command post for writing and editing *dBASE* programs with *Brief*, but it does much, much more to increase your productivity.

Instead of starting *dBASE* and calling an editor when needed, you start *Brief* with *dBrief* in place. You reap all the benefits of *Brief*, with automatic intelligent indentation added to format your program in a structured manner. The indentation recognizes *dBASE* keywords for conditionals and loop structures and indents or outdents accordingly (you can also apply this process to code you've written previously). Various control sequences generate Store and Replace commands automatically,

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Fantastic. D.G., Singapore
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Houston, Texas 77024
(713) 464-7465
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PreCursor

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PC MAGAZINE FACT FILE

Brief/dBrief
Solution Systems
335 Washington St
Norwell, MA 02061
(617) 659-1571
List Price: $250
Requires: 192K RAM, one floppy drive, DOS 2.0 or later.
In Short: A superb editor for programmers enhanced with *dBASE*-specific tools that greatly improve programmer productivity. Not copy protected.

CIRCLE 815 ON READER SERVICE CARD

comment your code automatically, add Picture clauses with only a few keystrokes, increment screen coordinates for Say and Get statements automatically, and more.

dBrief's enhancements control your entire program development process. You can create databases; index files; test programs; create report and label forms; call Ashton-Tate's *dFORMAT* and *dCONVERT* programs; draw boxes, lines, and frames; optimize code; generate *dBASE* source code based on formatted screen files; and more. If you use either the *Clipper* or *dBIII* compilers, you can interface to them as well, and *dBrief* can create the special NTX index files used by *Clipper*. You can compile and link under *dBrief's* control, too.

All these things happen while you are running *dBrief*. Some of the routines call *dBASE* or one of the compilers, but you always return to *dBrief* when they finish. Combined with the added efficiency of the *Brief* system itself, the total package can completely transform the way you develop *dBASE* applications.

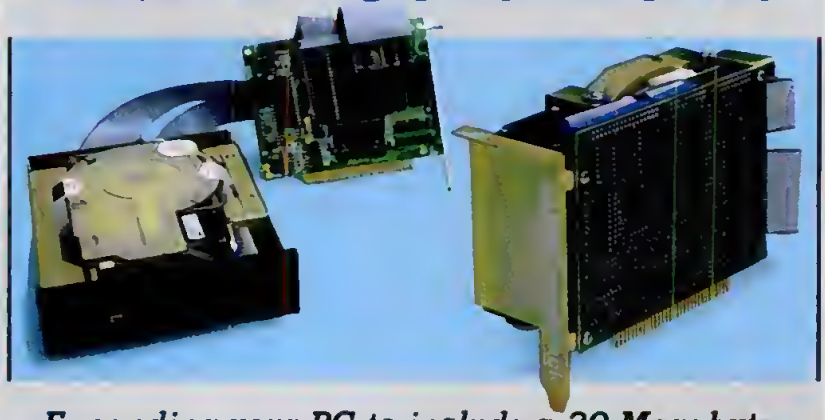
These programs are not without rough edges. Installing *Brief* and *dBrief* is a rather tricky procedure and not for beginners or the faint of heart. Both *Brief's* and *dBrief's* documentation could be improved in this area. The system also hogs memory if *dBASE* or one of the compilers is to run under *dBrief's* control; a full 640K is highly desirable. An experimental automatic documentation feature didn't work at all. But these are minor problems.

Overall, *Brief* is an excellent and efficient editor with capabilities that are truly useful for *dBASE* programmers. It's not for casual *dBASE* users, but if you're a serious programmer or developer of commercial applications, the *Brief/dBrief* package is one of the best investments you can make.

Quickpack

Fox & Geller Inc., perhaps the best-known purveyor of *dBASE*-support programs, recently struck oil with a superb utility called *Quickindex* that indexes *dBASE* files in a fraction of the time *dBASE III* itself takes. Now the company has introduced two new utilities cut from the same cloth. *Quickpack* streamlines the Pack function and

Hard Solutions



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Reliability:	14,000 Hours

The Pentagon Ashtray

The military is famous for paying $450 for ashtrays. A lot of companies are asking the same kind of outlandish sums for a hard disk mounted on a card. You get a hard disk, a controller, and a bracket, and they charge you hundreds more than you pay for a Qubie' 20 Megabyte hard disk system. Unlike the others, our HardPack 20 fits into a single slot and nestles in behind your floppy drives. If you buy any other hard drive, you may simply pay more and get a whole lot less.

The Choice

We offer both types, an internal mounted like your floppy, or a card mount for the same $499 price. Let's face it, the bracket doesn't cost us 450 bucks. While some people prefer the standard mounting, (like a floppy) so they can see the read/write light, others want a card mount so they can use both floppies they now have. Both drives boot directly from the hard disk, and require no software patches. They run all the popular software, and are low power. Our format software allows changeable interleaving that gives you noticeable speed improvement over the standard XT drive. Both have the ability to run a second drive from the controller, (Part Number 2nd-20HP $399), giving you 40 megabytes of storage for under $900.

The Goodies

We give you some software that really enhances the use of a hard disk. 1dir is the hard disk organizer that really makes DOS a snap, and our special Qubie' version of ZyIndex, the super searcher is also included. Easy to read manuals make installation a snap. Of course the drives are backed by our "No Risk Guarantee", our one year warranty, and 48 hour turnaround on warranty repairs. The price is the whole price; there are no extras for freight, insurance, or credit cards. Order part numbers PC20 for IBM PC and compatibles. PC20-1000 for Tandy 1000, or HardPack 20. By popular demand we still offer the matching ashtray for just $450, (Part No. PCKIDDING).

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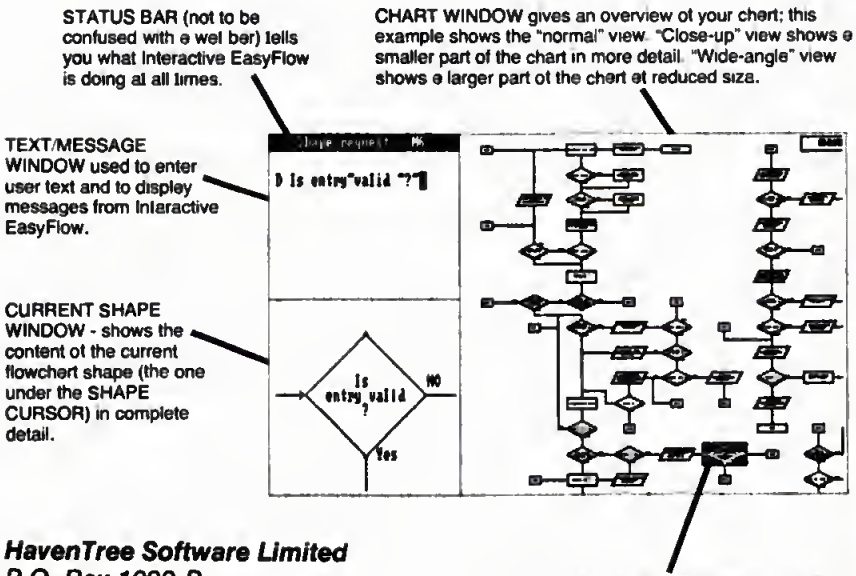
Requires at least 256K memory, DOS-2 or higher and an IBM or Hercules compatible graphics card.

Order direct for only **$149.95** + $2.00 S&H (USA/Canada), $10.00 (foreign). Payment by MO, check, VISA, COD or Company PO. Rush orders accepted ($15.00 S&H; USA/Canada only). Rush orders received by noon will be delivered the next business day (to most locations).

The sample screen display shown below is typical of what you see while editing a chart. Other screen displays are provided for entering titles, changing options, getting "help" and so on.



HavenTree Software Limited
P.O. Box 1093-P
Thousand Island Park, NY 13692
(613) 544-6035 ext 49

CIRCLE 201 ON READER SERVICE CARD

Quickclean, which comes with *Quickpack*, removes wasted space from *dBASE* memo files.

To test *Quickpack*, I packed a massive 1.8-megabyte data file containing 6,233 records with *dBASE III*'s own Pack command and *Quickpack*. Sixty-one records, randomly scattered throughout the data file, were marked for deletion. This test was run on an IBM AT with 640K running at 8 MHz with a fast Tallgrass 80-megabyte hard disk.

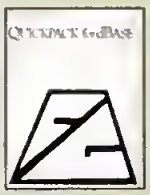
The results were astounding. *dBASE III* took 10 minutes and 46 seconds to pack the test file, while *Quickpack* took only 31 seconds! The Fox & Geller utility did the job in less than 5 percent of the time required by *dBASE III* itself!

The resulting file worked perfectly, although its length was not identical to the packed version created by *dBASE III* itself. This phenomenon occurred with *Quickindex* as well. I have no idea why the file lengths don't match, but everything worked fine just the same.

Quickpack is supplied with another utility named *Quickclean*. It removes wasted space from *dBASE III* memo files (.DBT) if any fields have been edited or deleted. *dBASE III* creates a new memo record when any changes are made to an existing one but doesn't delete the original record. Ashton-Tate suggests writing and rereading the file, but this is obviously a time-consuming, cumbersome process. You can perform the garbage collection with *Quickclean* much, much faster.

Quickpack is so fast that you can perform packs more often and maintain your

PC MAGAZINE FACT FILE



Quickpack
Fox & Geller Inc.
604 Market St.
Elmwood Park, NJ
07407
(201) 794-8883
List Price: $99
Requires: 256K RAM, DOS 2.0 or later.
In Short: Packs *dBASE III* files to reclaim the space occupied by deleted records much faster than *dBASE* itself. Not copy protected.

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One Great Idea Inspires Another.

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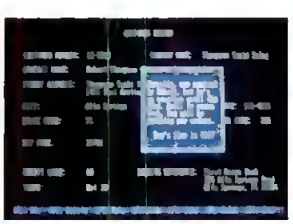

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Here at PCSG we sell our IBM PC disk access speedup software by the thousands. But software doesn't do anything about speeding up the microprocessor (or CPU) speed. As you know the microprocessor is the brain of the computer that controls all the operations like screen updates and calculations like a spreadsheet makes.

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We wanted to offer a speedup card that would be the compliment to our disk speedup software, (incidentally included at no extra charge.) We wanted it to be literally the most advanced, fastest, most feature rich board available today. We could only be satisfied with a board that was the finest example of the engineering art.

There is no question we have met our every objective by developing and manufacturing the *BREAKTHRU 286* card. This is the best designed and most functional speed up card available today. We guarantee it.

HERE IS WHAT MAKES IT SO SPECIAL.

First, it installs so easily. It is a half slot card, only five inches in length. You don't even have to give up a full slot. What's more, unlike competing products it works in the Compaq and most clones. The instructions are so simple we considered showing a picture of a child putting it in. Easy diagrams show how you just place the card in an open slot, remove the original processor and connect a single cable. There is no software required. From that moment you are running faster than an AT.

Second, it is advanced. The *BREAKTHRU 286* replaces the CPU of the PC or XT with an 80286 microprocessor that is faster than the one found in the AT. A 16K cache memory provides zero-wait-access to the most recently used code and data. In benchmark tests the card accelerated software programs—both custom and off-the-shelf anywhere from 200% to as much as 700%. Wow!

Third, you have full compatibility. All existing system RAM, hardware, and peripheral cards can be used without software modification. It operates with LAN and mainframe communication products and conforms to the Lotus/Intel/Microsoft Expanded Memory Specification (EMS). Software compatibility is virtually universal.

Fourth, it is the best there is. There are several other boards on the market. Some are priced about the same as the *BREAKTHRU 286* and some are cheaper. We at PCSG have compared them all, but there simply was no comparison. What we discovered is that many cards being sold offer only a marginal speed up in spite of their claims. We found some to be merely versions of the obsolete 8088 or 8086, and others to be just poorly engineered. The 8MHz *BREAKTHRU 286* is unequivocally the best executed and most completely reliable speedup board manufactured today.

PCSG has since early 1983 dominated the lap portable market with ROM software such a Lucid spreadsheet and Write ROM that reviewers rated as excellent. We were proud to successfully enter the IBM PC market last year with disk access speedup software. Now we are so pleased with the *BREAKTHRU* speedup card. We use them on our own PC's to make them faster than AT's. We are really excited about this product.

PCSG makes the unabashed statement that the *BREAKTHRU 286* card represents more advanced technology than boards by Orchid, Quadram, Victor, Mountain, P.C. Technologies, Phoenix... we could go on.

But an ad can't let you experience it for yourself. That's why we sell the *BREAKTHRU 286* on a 60 day trial. If you aren't completely satisfied return it within 60 days for a full refund. It is priced at $595. Call today with your MasterCard, Visa, American Express or COD instructions and we will ship your card the very next day.

CIRCLE 108 ON READER SERVICE CARD

PERSONAL COMPUTER SUPPORT GROUP

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214-351-0564

VISA

data files in cleaner and more compact form. Fox & Geller has another winner for serious *dBASE III* fans.

SayWhat?!

SayWhat?! is a screen generator that allows you to paint lovely screens in almost any high-level language. It focuses primarily on *dBASE II* and *dBASE III* but also supports Turbo Pascal and BASIC. With minor adjustments, you could use it with other languages, too.

SayWhat?! gives you a powerful arsenal of screen painting tools. Various forms of lined boxes and a variety of video attributes are easy to specify, with gorgeous color help screens to help you along the way. You can use any graphics characters available on the PC, position Say and Get statements (or Input or Writeln or whatever, if you're using some other language), and add Using or Picture clauses quickly. Editing screens is also easy, with block moves, block copies, and other aids available. You can define windows, assign them attributes, fill them with text, and place them anywhere on the screen in no time at all.

SayWhat?! achieves its universality through its method of operation. A small memory-resident utility is installed once, and your program calls this routine. Your screens "snap" onto the display almost instantly—much faster than your program could write them through the normal DOS

PC MAGAZINE FACT FILE

SayWhat?!
The Research Group
88 S. Linden Ave.
South San Francisco, CA
94080
(800) HOT-WARE
(800) 231-7849 in Calif
(415) 571-5019

List Price: $39.95
Requires: 192K RAM, one disk drive, DOS 2.0 or later.
In Short: An easy-to-use yet powerful screen generator for beautiful entry/edit screens and pop-up windows. Not copy protected.

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Information Service No. 49

routines. *SayWhat?!* actually writes the screen program for you in the language you've selected, complete with Say/Get or the equivalent constructions, but the program calls a special form of your screen to perform the screen display itself.

SayWhat?! is so well structured that it won't take you more than an hour or so to become completely proficient. The manual is very well written, but the help screens are so beautiful that you probably won't have to refer to the printed documentation more than once or twice.

Perhaps the best part is that *SayWhat?!* costs only $39.95, isn't copy protected, and doesn't charge royalties if you incorporate *SayWhat?!* screens in your code. It's legitimately a bargain. I have a slight preference for screen generators that write pure *dBASE* code rather than requiring the machine code interface or that can use either method (like Software Bottling's *FlashCode*), because there's less possibility for conflict (*SayWhat?!* wouldn't work with one of my favorite utilities, *TallScreen*, in place, for example). *SayWhat?!* works so well in general, though, that I can highly recommend it. *SayWhat?!* lets you create beautiful screens quickly with a minimal investment of time and money.

dFlow

dFlow is a debugging aid that helps you locate logic errors, indent your code, and otherwise isolate problems with your applications. It is not a true debugger in that it does not set breakpoints, step through a program and examine the variables, and so forth, but it performs several related functions.

While *dFlow* certainly helps you tighten up your programs, perhaps its best use is as a documentation tool. Everyone prefers writing code to documenting it, even though they know they should devote equal care to writing good technical documentation. *dFlow* produces a very good

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dFlow
WallSoft Systems Inc.
233 Broadway, #869
New York, NY 10279
(800) 23d-FLOW (outside New York)
(212) 406-7026
List Price: $129
Requires: Any version of DOS, *dBASE II*, *dBASE III*, or *dBASE III Plus*.
In Short: A valuable tool for analyzing programs, revealing logic errors, and documenting applications. Not copy protected.

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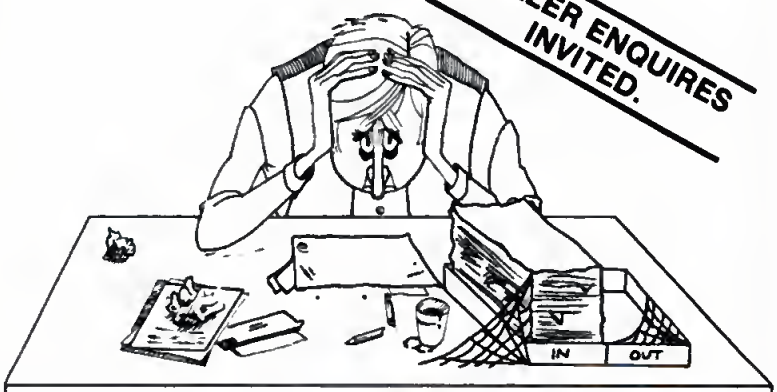

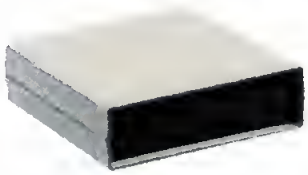

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module cross-reference, which shows the interdependence of the various programs. Usually, they form a complete application, and its variable cross-reference is useful, too.

Running *dFlow* is totally straightforward. You simply activate the options you want from a simple main menu and select the program to analyze. *dFlow* is smart enough to trace an entire program tree. Its output, including line-numbered, indented, and paginated program listings, if desired, can be displayed, printed, or sent to a file for later processing or inclusion in your documentation. You can install color options of your choice to improve visual differentiation on the screen if you have color hardware.

I tested *dFlow* on a commercial *dBASE* application I wrote and sell and was impressed with the results. While it located no bugs (thank goodness!), *dFlow* pointed out that one loop wouldn't be executed more than once and that certain debugging statements I routinely insert would never execute. The analysis was fast and trouble-free.

dFlow is both simple and effective. It's not a substitute for a traditional debugger, but it will help you find programming errors and document your system.

Print Bar

Database programs are often used for inventory control, where their ability to handle many items, analyze movement and financial return, generate reports, and

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Print Bar
Bear Rock Software Co.
P.O. Box 212
Placerville, CA 95667
(916) 622-4640
List Price: $149
Requires: 256K RAM, one disk drive, DOS 2.0 or later.
In Short: Produces standard bar codes on matrix or laser printers from your data with *dBASE II*, *dBASE III*, BASIC, and other languages. Not copy protected.

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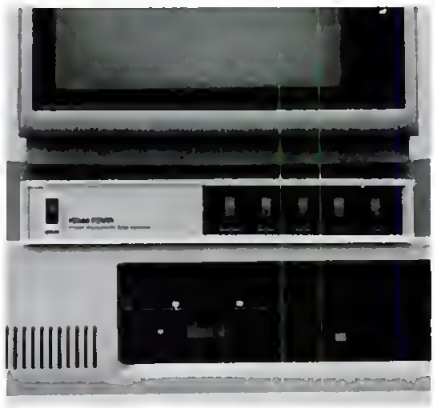
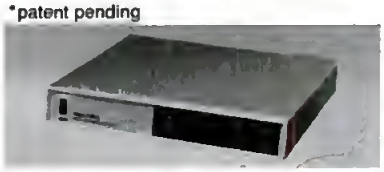


*patent pending



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otherwise manage this type of problem is first rate. Increasingly, optical scanning of bar codes is being used to make data input to these systems faster and more accurate. Most commercial systems use preprinted bar-code labels to mark stock items, but there are many drawbacks to this approach. For example, you may want to give the same stock number to multiples of the same product, and you may have your own numbering system.

Bear Rock Software's *Print Bar* enables you to sidestep these problems. *Print Bar* is a group of programs that allows you to print your own bar code labels with Epson or Okidata dot matrix printers for total flexibility and control over the bar-coding process. The program is available in three versions—for *dBASE II*, *dBASE III*, and Microsoft BASIC. The source code is included, and the logic is so straightforward that you could easily write equivalent routines in other languages as well.

The documentation spends only a page or two on how to run the programs, which are essentially self-explanatory. The rest of the manual is an in-depth explanation of the various methods of bar coding in common use (*Print Bar* uses the code 3 of 9 method, which is the only technique that can print a full alphanumeric character set, but the programs are so flexible that you could modify them to generate other code styles as well), the trade-offs of each method, how different types of scanners work, and even a list of vendors to contact for hardware.

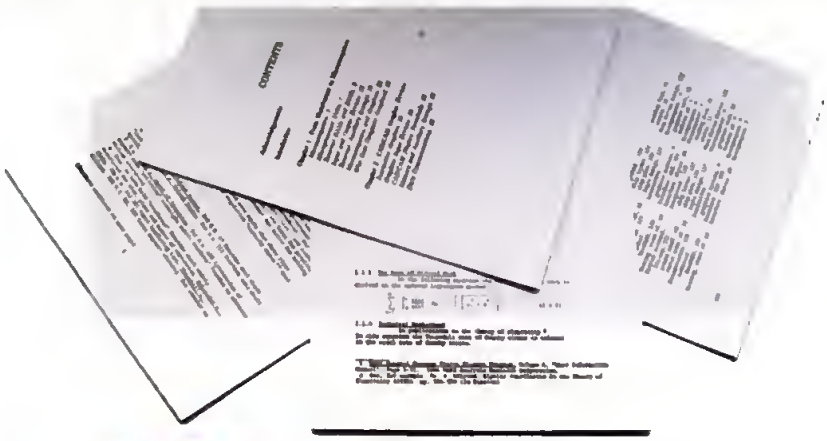
I tested *Print Bar* with my Hewlett-Packard LaserJet Plus emulating an Epson printer under SoftStyle's *Printworks for Lasers*. The programs worked smoothly and without incident.

Print Bar adds a new and useful dimension to *dBASE* with a minimum of fuss and bother.

Professional Development Library for dBASE III

Some libraries of programs and routines claim to include everything but the kitchen sink, but all too often they're full of cryptic code that takes so long to figure out that you'd be better off programming the stuff yourself.

This is not the case with the *Professional Development Library for dBASE III* from Global Technologies. *PDL* is a virtual treasure trove of utilities, complete subsystems, and tools to really make *dBASE* sing and dance. Source code is provided for almost everything, and so integrating these programs into your own applications is straightforward. The source code is well



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documented and surprisingly easy to follow in most cases, but you must be a serious and knowledgeable *dBASE* programmer to extract its full benefit. Some of the on-disk documentation is sketchy, but if you're sophisticated enough to use these programs, you also are experienced enough to figure out what's going on from the source code itself.

The library includes a few weak items, but the overwhelming majority of the entries are very good, and many are truly first rate. The six distribution disks are chockful; here's a brief glimpse at some of the items:

A DOS emulator lets you add DOS commands to any menu by using the RUN command to simulate running DOS from within *dBASE*. A financial graphics package produces good-looking on-screen business graphics from *dBASE* data. The results are better than several commercial programs specifically designed for this function. Mouse fanciers can use a very clever interface to the Microsoft menu language supplied with that hardware device. *dBASE* sends the appropriate instructions to the mouse language, which actually implements the menu structure. Another clever program converts text files into *dBASE* procedure files to create an on-line documentation system with forward and backward paging. Two shell programs are provided to insulate the end user from DOS and act as a central focus for all system operations. Both are effective, but the newer of the two uses light-bar menus and is elegant and simple.

PDL contains several windowing routines. Whether you use *dBASE III* or *dBASE III Plus*, one package arranges screen output to simulate a polished desktop/windowing environment. Screenmaker is a tool to place boxes in position on the display screen with any of several frame styles. *Clipper* users have several more-sophisticated options. Frameup implements exploding and imploding windows much like those in *Framework* and

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Professional Development Library for dBASE III
Global Technologies
16572 E. Louisiana Dr.
Aurora, CO 80017
(303) 337-7758
List Price: $195
Requires: *dBASE III*, *dBASE III Plus*, *Clipper*, or *dBASE III*/Compiler.
In Short: A massive collection of useful routines and applications for the advanced *dBASE* programmer. Not copy protected.

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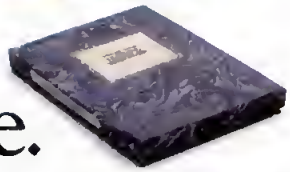
...or the most simple.



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can save and restore up to nine distinct screen images. Lightbar creates light-bar menus. The winter 1986 version of *Clipper* already performs this function, but the *PDL* method, which uses a database to define menu structures, allows redefining menus without recompiling.

PDL's Menu Design System is a stellar package that may be worth the price of the entire *PDL* if you like the pull-down menu interface approach. MDS actually creates the programs that reflect the menu selections you specify, stubbed for you to insert the code to branch to your program modules. The MDS interface itself is very intuitive, and, as Global claims, it takes only 5 minutes or so to develop an elegant user interface.

There are many other useful programs and a slew of creative programming techniques throughout the library. I especially like the new user interface approaches, but I plan to incorporate several of the routines and techniques in my commercial *dBASE* and *Clipper* applications. If you take your *dBASE* programming seriously, *PDL* can help you create more-elegant, easier-to-use applications with minimal effort.

dBChart

dBChart is a business graphics program designed to extract information from *dBASE II* or *dBASE III* data files and produce various types of charts. Manufactured by WordTech Systems, which also markets the *dBII* and *dBIII* compilers, the program has some interesting features and also some serious weaknesses.

dBChart isn't copy protected and doesn't need any installation, primarily because it supports so few hardware options. It works only with a standard IBM Color/Graphics Adapter and only the IBM or Epson dot matrix printers—inadequate for any serious graphics program.

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dB CHART

dBChart
WordTech Systems Inc.
P.O. Box 1747
Orinda, CA 94563
(415) 254-0900
List Price: $99
Requires: 128K RAM, one disk drive, CGA-type color adapter and monitor, 80- or 132-column IBM or Epson graphics printer, *dBASE II* or *dBASE III*, DOS 2.0 or later.
In Short: Creates attractive business graphics from *dBASE* data files but is handicapped by a very limited selection of display and output hardware. Not copy protected.

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dBChart creates eight types of charts: column, stacked column, deviation (columns above and below a central line), line, step, pie, donut (a pie chart with a hole in the middle), and pictograph (column charts comprised of symbols). Several common types like horizontal bars, area graphs, and Gantt charts are unavailable.

dBChart displays a graphic gallery of chart types for you to choose. The user interface employs the PC's function keys to good advantage. Function key definitions and brief single-line help messages are available if you need them.

Once you have drawn a graph, a pop-up window lets you control which data to plot, hatching patterns, axis names, grid lines, placement of data values on the chart, tic spacing, and similar chart characteristics. Choosing what you want is more difficult than it should be because you have to enter cryptic numbers for several variables; *dBChart* doesn't remind you of what these numbers mean. It would have been just as easy for the program designers to use words instead.

A clever pictograph system builds charts from symbols. A few symbols are supplied with the program, but you can define your own easily by filling in a grid of squares; it works something like the FatBits feature in the Macintosh *MacPaint* program. You can store up to 26 symbols for emphasizing various chart elements. This is visually effective and simple.

dBChart extracts data from *dBASE* files using a program called GRAPH, which creates an ASCII text file for *dBChart* to use. *dBChart*, in turn, creates a text file that stores all your choices for graph type, hatching patterns, screen colors, and so on. This process is straightforward and works well, but it isn't all that much easier than converting normal *dBASE* data with the Copy To Delimited command and charting the data with any number of commercial graphing programs.

The on-screen charts are better than some graphics programs, even with the relatively low resolution of the CGA. Printed versions are adequate, especially when compared with plotter results. *dBChart* doesn't compare with the quality chart programs available for the PC, most of which offer much more flexible video and output options as well.

Memo Searcher

dBASE III and *dBASE III Plus* include one type of field that is rarely used by most programmers. Memo fields store large chunks of text in a separate file linked to a main .DBF data file. The memo field occupies only 10 bytes in the main file, but the text itself can run to 5,000 characters if you use *dBASE*'s word processor or much more if

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you use an external word processor.

Memo fields are useful for storing contact histories, miscellaneous free-form data on sales contacts, and the like. They're much more efficient than defining long standard fields to hold comments, because they don't occupy disk space until text is entered, while standard fields consume space whether you have put text in them or not. Unfortunately, *dBASE* doesn't offer much support for memo fields, so this feature languishes in the netherworld of unused commands.

Memo Searcher is a member of an extensive line of very low-cost *dBASE* utilities sold by Data Based Solutions. It lets you determine which records have memo fields containing a text string you specify, much like search programs that look for phrases or words in groups of text files.

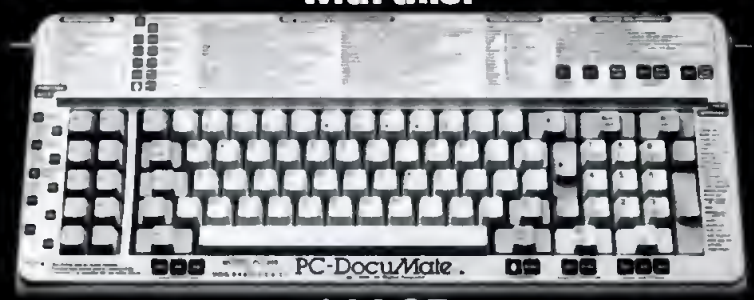
The package consists of three programs. MEMOVIEW displays memo fields that contain your search string on the screen. MEMOREPT sends matching memo fields and their record numbers to a disk file called MEMOREPT.DAT, so you can examine or print it later. MEMOFILE is a bit more complicated. If you define the first field of your data file as a logical field called MEMOMARK, this program will scan the memo field and set MEMOMARK to T (true) if it contains your string. You can then program a simple loop to display the matching records or use the field to select records for reports.

You can execute each program from DOS or from *dBASE* with the Run command. You can specify the data file and search text on the command line, or the programs will prompt you interactively. All three run perfectly with any combination of these methods. Matching memo fields are located quickly and without fuss.

The *Memo Searcher* package really helps you make good use of *dBASE*'s memo field feature. The package is worth many times its minimal $15 cost. PC

Glenn Hart is a contributing editor of PC Magazine.

Instead of this... ...you can have this with this!



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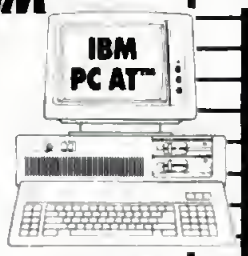

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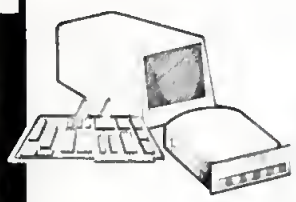

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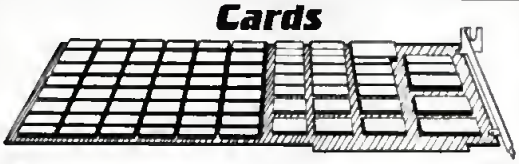

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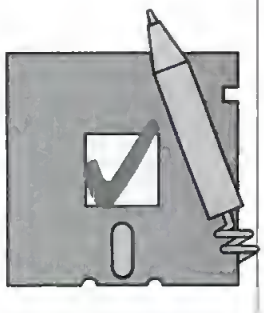
CIRCLE 202 ON READER SERVICE CARD

■ **PC LAB NOTES:** GETTING ON-LINE ■ M. DAVID STONE

GETTING ON-LINE WITH YOUR PC



Step-by-step approaches to calling on-line information, database, and electronic-mail services with the three most popular communications packages around.

A universe of electronic information is at your fingertips. All you have to do is connect your computer to the phone lines and know where to call. And how.

To help get you started, here's a primer on how to call some of the most popular information, database, and electronic-mail systems using three of the most popular programs. The examples assume that the modem uses the Hayes command set (the de facto standard), which is also known as the AT command set. Almost every modem for the PC does. To illustrate the various procedures, we'll use an electronic-mail service (MCI Mail) and a bulletin board (*PC Magazine*'s Interactive Reader Service) as examples.

MCI Mail is a favorite of *PC Magazine*'s editors for sending memos and as the transfer medium for authors and editors who are filing and editing stories on the road. (This issue of PC Lab Notes, for instance, was filed with MCI in Mount Vernon, New York, proofread by the senior editor traveling in Southern California, and then proofread by the technical editor in New York City, all for $6 in transmission charges.) If your recipient doesn't have an MCI electronic mailbox, printed copies can be delivered overnight for roughly half the cost of a Federal Express letter or by first-class mail for about $2. MCI Mail also gives you access to the worldwide Telex network.

PC Magazine's IRS is the source for dozens of free programs and utilities that can make you and your PC more productive.

MCI MAIL MCI Mail is available through a local call in 50 cities, through the Tymnet data communications network in 500 cities, and through an 800 number from anywhere in the United States. Tymnet costs 5 cents a minute; MCI's "toll free" number is 15 cents per minute. We'll use the 800 number in this example; calling through Tymnet involves a slightly different procedure.

CALLING MCI MAIL WITH PC-TALK III The easiest way to call with *PC-TALK III* is by typing in the necessary commands directly from the keyboard. Load the program (type PC-TALK and hit Enter), then type ALT-F to see the current program defaults. Alt-F is for defaults (Alt-D was taken for dial). Use the Return key to move through the list, setting the transmission rate to 300 or 1200, parity to N, data bits to 8, and stop bits to 1. Hit Enter to leave existing values unchanged, including any you don't understand for the moment. Also set the logged drive, printer port, and communications port; if you're not sure, your best guesses are A:, LPT1:, and COM1:, respectively. (If COM1: doesn't work, try COM2:.) *PC-TALK III* will ask if the settings are okay and if you want to save them to disk (under the filename PC-TALK.DEF). Answer yes to both questions.

■ MCI Mail is available through a local call in 50 cities, through Tymnet in 500 cities, and through an 800 number from anywhere in the U.S.

PC-TALK will respond with "Proceed." Now you can type commands to the modem. Try AT <Enter>. The modem should respond with an OK on your screen.

Now type the command for dialing the phone. The simplest form is

```
ATDT 1 800 323-0905
```

AT calls the modem to Attention. D tells it to dial. T tells it to use tone dialing. Other commands available at this point are P for pulse dialing and a comma to create a pause, usually for 2 seconds. Spaces and dashes are ignored, but the commands must be entered in capitals (except for 1986 model Hayes modems, which understand lowercase commands). If you are calling through a switchboard that needs a pulse-dialed 1 to connect to local touch-tone lines and if you need a 1 before the area code, you would type

```
ATDP 1, T1-800-323-0905
```

The modem will pulse dial "1", pause, and then tone dial the rest of the number. If your modem includes a speaker, you will hear it dial, hear the phone ring, and hear the modems establish communications. If

■ PC LAB NOTES

you get a busy signal, you can tell *PC-TALK* to redial indefinitely by typing Alt-Q. When it finally gets through, it will signal you through the PC's speaker with a loud beeping.

Once the connection is established, *PC-TALK* will report "CONNECT." Prompt MCI Mail that you're there by hitting Enter once or twice.

Answer MCI's response with the name assigned in your MCI Mail registration. It will then ask for your password. The password will not show on-screen when you type it. If you type it correctly, the system will respond with the main menu. If not, it will tell you to try again.

AUTODIALING WITH PC-TALK III *PC-TALK* can dial the phone for you from a built-in, personalized directory list. From the *PC-TALK* main screen, type Alt-D for the dialing directory. Choose R to revise or add to the directory. Then follow the prompts to pick a number, enter the name (MCI Mail), phone number ((800)-323-0905), transmission rate (300 or 1200), parity (N), data bits (8), and stop bits (1). You can skip the rest of the settings. You may want to answer yes to Strip/Convert String. Then enter

```
000/000//////////////////
```

to purge your downloaded files of nulls, which will otherwise show up as @ marks. Once the phone number is entered, you can dial MCI Mail by typing Alt-D to get to the dialing directory, then selecting the directory number.

You can also put your user name and password on function keys. From the main screen, hit Alt-K to see the function key directory and then R to revise a key. Follow the instructions to define the key. If you define F1 as your user name and F2 as your password, you can log on semiautomatically: type Alt-D, the directory number, wait for the connection, type one or two carriage returns, then F1, and then F2. If other people have access to your copy of *PC-TALK*, however, it may not be a good idea to put your password on a function key. Your user name isn't secret; your password is.

Shortcut: you can enter your MCI Mail user name and password on one line, separated by two slashes, thus:

```
username//password
```

If you get lost, the Home key provides a summary of commands. If you see everything twice, or not at all, hit Alt-E to turn ECHO on or off.

CALLING MCI MAIL WITH CROSSTALK XVI The first time you load *Crosstalk XVI*, Version 3.6, (type XTALK), you'll see the names of three command files and a request to pick one. Choose Setup. This file will ask you to enter the settings for your modem (make and model), communications port (COM1: through COM4:), default transmission rate (usually 1,200), and screen type.

Answer the setup questions, then answer yes when the program asks if you want to save the new default settings. (Don't worry if you've made a mistake. You can rerun Setup at any time.) These new settings will be stored in a file called STD.XTK and will load automatically whenever you start *Crosstalk*.

Crosstalk comes with default settings of 8 data bits, no parity, and 1 stop bit. You can check these settings on the main status screen under communications parameters. If the screen is not showing, you call it up by hitting the Home key.

The bottom line of the *Crosstalk* screen is used for messages and for giving commands. If you find that you need to change the communications settings, hit the Esc key to get the *Crosstalk* "Command?" prompt. Then type the first two letters of the command (DA for Data, PA for Parity, and ST for Stop) followed by the proper setting and hit the Enter key.

■ If others have access to your copy of *PC-TALK*, it may not be a good idea to put your password on a function key. Your user name isn't secret; your password is.

ASSESSING THE MAIN INFORMATION SERVICES

The business of finding the right on-line connections.

In choosing systems to sign up with, be aware that the same database can be on different systems at different prices. That's because most on-line systems are essentially retail stores. The system buys the rights to distribute a database.

Also be aware that many systems provide gateways to others. For example, if you travel a lot, you may be interested in the Official Airline Guides. The OAG is an on-line system itself. (Offical Airline Guides Inc. 2000 Clearwater Dr., Oak Brook, IL 60521; (312) 654-6000; sign-up fee is $50.) You can also access the OAG through The Source, CompuServe, DIALOG, Dow Jones News/Retrieval, or NewsNet.

Gateways let you save on registration fees, and they can give access to two or more systems with a single password. There are at least two other gateways you should be aware of:

- If you sign up with MCI Mail, you will find Dow Jones News/Retrieval as a choice on the main menu. And if you sign up with DJN/R, you'll have the same easy access to MCI Mail.
- EasyLink offers a news service called FYI and an information retrieval system called InFact. InFact gives access to all databases on BRS, DIALOG, SDC/ORBIT, NewsNet, and three other systems for a total of 650 databases.

—M. David Stone

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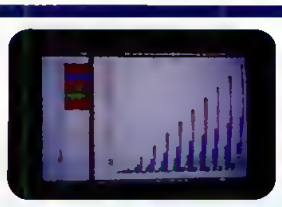
- Four background, one foreground mode. Can print on two printers or plotters and two communication devices (modem and main-frame direct connection) all at the same time.
- Artificial Intelligence features reduce the number of keystrokes required to perform tasks
- Upgradable software and data to UNIX and XENIX

- **Package contains:** one plastic box, one illustrated reference manual, one program disk, one sample diskette, keycaps and user support plan
- **System Requirements:** IBM PC or compatibles, 512K, two 360K diskette drives, color or mono display
- Twenty-four hour Hotline Support (optional)

Multiple windows allow quick movement between tasks.



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■ PC LAB NOTES

TEN USEFUL PROGRAMS FROM PC MAGAZINE'S IRS

Listed below are ten of the most popular programs on *PC Magazine*'s IRS. Most take up where DOS left off or are a patch that blows the DOS equivalent out of the water. Few are available in other commercial utility packages.

While you can type them in by hand using most any word processor or text editor, they're only a phone call away if you have a modem, at (212) 696-0360. The programs are available from the IRS in three forms: an executable .COM file, a .BAS BASIC listing, and an assembly language listing. These last two should be run through a compiler in order to create something useful. For more on these programs and utilties, see the Programming/Utilities column in corresponding issues of *PC Magazine*.

■ BROWSE. Move through a file line by line or page by page (see Volume 5 Number 6).

■ DDIR. Does a directory listing in two columns and in alphabetical order, pausing if the listing covers more than a screenful. Unlike the DOS DIR /W command, this program doesn't omit the file size or modification date (see Volume 4 Number 20).

■ DELZ. An erased file isn't really gone when you type DEL filename. This program deletes sensitive files and writes over them, so that they can't ever be resuscitated by a nosy colleague or adversary (see Volume 4 Number 21).

■ DOS-EDIT. This memory-resident DOS editor lets you change and use DOS commands on the screen. Beats the F3 key (see Volume 5 Number 3).

■ KBM. Creates a keyboard mouselike driver that zips as fast as mice but without the fur (see Volume 5 Number 4).

■ KEY-FAKE. Extends batch-file usefulness by inserting keystrokes. If you have a batch file to delete everything in a subdirectory, you could insert the line KEY-FAKE "Y" to answer the DOS question, "Are You Sure? Y/N" (see Volume 4 Number 26).

■ NO. Makes exceptions to DOS commands. For instance, NO *.COM DEL *.* deletes everything *but* the .COM files in the current subdirectory (see Volume 5 Number 9).

■ QUICKEYS. Speeds up all the keys on your keyboard (see Volume 5 Number 5).

■ SWEEP. Runs DOS commands through all subdirectories on a hard disk (see Volume 4 Number 23).

■ VTREE. Creates a visual tree of subdirectories on a hard disk. This utility withers DOS's TREE (see Volume 4 Number 22).—**Christopher Johnston**

To call an on-line system manually with *Crosstalk*, type GO LO from the command line. This tells *Crosstalk* to "go local"—or go on-line immediately, without dialing or answering the phone.

At this point, you're talking directly to the modem. The instructions for dialing and signing on to MCI Mail are the same as with *PC-TALK:* use the AT dial command to dial the phone, wait for the connection, hit Return to wake up MCI Mail, and enter your user name and password.

AUTODIAL WITH CROSSTALK To get *Crosstalk* to dial the phone, you have only to tell it the number you want to connect with. It's really a very simple procedure. From the command line, type the letters NU (number), hit the Return key, and then enter the phone number. Type GO, and *Crosstalk* will automatically dial, leaving the log-on to you. To save the number for future use, type SA MCI at the command line. Once it's saved, you can reload the settings at any time without going through the full procedure by entering the command LO MCI. (In this instance LO stands for load, not local.)

Crosstalk can automate the log-on procedure through a script file. Use any text editor that will produce ASCII text to create the following script. Use the filename MCI.XTS

```
wa d 10
re |
wa d 10
re |
wa string ":"
wa d 5
re USERNAME|
wa string "Password:"
wa d 5
re YOURPASSWORD|
```

The first line waits (WA) for a delay of 10 seconds. Line 2 replies (RE) with a Return (the |, a vertical bar). Lines 3 and 4 repeat lines 1 and 2, in case the first Return was lost.

Lines 5, 6, and 7 wait for MCI Mail to send a colon (string " : "), then wait for an additional delay of 5, then reply with your user name (not the word USERNAME) followed by a return. (Put your user name here. The | (vertical bar) sends the return.)

Lines 8, 9, and 10 wait for MCI Mail to send the *string* password:, then wait for an additional delay of 5, then reply with your password followed by a Return. (Put your password here.)

Put the MCI.XTS script file on your *Crosstalk* disk or in the *Crosstalk* directory on your hard disk. To use it, load the MCI Mail settings with the command LO MCI. Give the GO command, and *Crosstalk* will dial the MCI number and then look for the script file and log on for you.

The delay times in this script are designed for an AT. If you're using a PC or XT, you'll find that you can cut the times at least in half to speed up the log-on.

CALLING MCI MAIL WITH SMARTCOM II As shipped, *Smartcom II*, Version 2.1, already knows most of what it needs to in order to call MCI Mail.

To use *Smartcom* the first time, load the program and choose your configuration options from the main menu. Set printer port, communications port, dialing method, available disk drives, and monitor and adapter options as appropriate for your system. (If you need help with any of these settings, place the cursor at the appropriate line and hit F2.) When you get to the bottom of the list, *Smartcom* will ask whether to record the changes to disk. Answer yes.

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You will be returned to the main menu.

Choose Begin Communication, then Originate. *Smartcom* will respond with its directory, which includes an entry for MCI Mail, using the 800 number. Select this option from the list, and *Smartcom* will dial the call to establish communications. If the line is busy, *Smartcom* will ask if you want it to "retry until carrier." Carrier is the high-pitched squeal modems issue when seeking each other out.

To see the communications settings for MCI Mail, abort the call with Esc, then choose Edit Set, and then hit P for parameters. Notice the Character Format is 8 data bits, no parity, and 1 stop bit. Also notice the phone number. MCI suggests that under Protocol Parameters you change the EOL character from 10 to 13, but I've used *Smartcom* as shipped without experiencing any problems.

Smartcom can fully automate the log-on for you. Hit Esc to go back to the main menu, then Edit Set, and then M for macros. *Smartcom* will respond with a directory of macros. Pick "Automatic log-on," and *Smartcom* will show you the definition screen.

As shipped, *Smartcom* has three entries on the MCI Mail automatic log-on. Line 1 sends a carriage return to wake up the system. Lines 2 and 3 wait 10 seconds each and then send the word *REGISTER*.

If you already have a user name and password, you'll want to change these two lines. Use the Return key to move the cursor to the "Data" entry for each line and then use the Backspace and typing keys to enter the appropriate information. Next, move to the "Prompt" column in lines 2 and 3 and use the cursor keys to change the prompt to ASCII 58. This tells *Smartcom* to wait for a colon from MCI Mail before sending the user name and then wait for another before sending the password.

With your user name and password entered in the program, go back to the main screen. Choose "Begin Communication," "Originate," and then "MCI Mail." *Smartcom* will dial the phone and log on.

If you leave the data entries blank for automatic log-on, *Smartcom* will autodial and then let you sign on with your user name and password. Here again, it is not a good idea to put your password in the program if others have access to your system. Imagine the advantage—not to mention the fun—cut-throat colleagues would have if they could leaf through your electronic mail without your knowing about it.

CALLING MCI MAIL THROUGH TYMNET Calling MCI Mail through Tymnet requires only minor changes. First you have to use your local Tymnet number. When Tymnet answers, it will automati-

TROUBLESHOOTING

Settings for software and hardware

Assuming that your modem is correctly connected to your PC and your phone line (see "Choosing and Using Modems," PC Lab Notes, *PC Magazine*, Volume 5 Number 8), you have to tell your software where to find the modem—on COM1: or COM2:. Most software comes installed for COM1:. If you're not sure which serial port your modem is connected to, try COM1: first. If there's no response, reset the software to COM2:.

If there is still no response from the modem, check the modem settings. These will vary from one brand to the next, but look for a setting that enables the modem's ability to recognize commands (switch 8 on the Smartmodem 1200 should be down, or "on," for example). Other settings to check include synchronous versus asynchronous (set to async), data versus voice (set to data), and Bell standard versus CCITT standard (set to Bell).

There are other settings for which there is no "correct" choice but where hardware and software must be set to work with each other.

Crosstalk XVI, in particular, is picky about modem settings. If you are having trouble with *Crosstalk*, check your modem's carrier detect (CD) setting. This must be set so it is on only when the modem is talking to another. If carrier detect is "forced true," *Crosstalk* will think the connection is already established and will refuse to dial the phone. On a Hayes external modem, for instance, switch 6 should be up (off). On a Hayes 1200B, switch 3 should be up (on).

Smartcom II will function with nearly any settings on a Hayes modem. The program will only work with close Hayes compatibles, however, so it may not always be the best choice for a non-Hayes-brand modem.

Smartcom needs to be installed for your monitor as well. As shipped, *Smartcom* expects a monochrome monitor. If you have a color monitor, the program will warn "incompatible display equipment" when you load it. To reset the program, choose "Change Configuration" from the main menu, then use the cursor keys to move to the "monitor and adaptor" choice, and type C for color.

If you have both a monochrome and a color monitor, *Smartcom* will run on whichever monitor it's installed for. If you load the program with only one monitor active and the screen freezes, check the other monitor before you reboot.

PC-TALK III is even more forgiving than *Smartcom II*. The only time I've ever seen *PC-TALK* confused is when there are no serial ports in the computer, or when more than one serial board is assigned to the same port. For a monochrome monitor, the best color settings for foreground, background, and high intensity are 15, 7, and 0, respectively, the program's defaults. Access them from the Alt-F (defaults) setting.

For more on the fundamentals of communications, see "Choosing and Using Modems" and "Paring Communications to the Bare Essentials," PC Lab Notes, *PC Magazine*, Volume 5 Number 8 and 9, respectively. In particular, if you have doubts about whether your modem program is making connection properly, Charles Petzold's 49-byte TINY.COM program in Number 9 lets you take direct control of your modem, without the insulating layers of sophistication of commercial programs.—**M. David Stone**

■ PC LAB NOTES

cally prompt you for a "terminal identifier." This may come out as garbage, depending on your transmission rate. Answer with an A (don't hit Enter), and Tymnet will respond with "please log in:". Type "MCIMAIL" <Enter>. Tymnet will connect you to the MCI computer, which will ask you for your user name and password.

You can add these additional steps to function keys in *PC-TALK III*, to the script file in *Crosstalk*, or to the automatic log-on definition screen in *Smartcom II*. In each case, delete the initial carriage returns.

MCI Mail insists you can call Tymnet with settings of 8 data bits, no parity, and 1 stop bit. This sometimes gets nothing but garbage. If you run into problems, try 7 data bits, even parity, and 1 stop bit (*Crosstalk* and *PC-TALK*), or 7 data bits, space parity, and 1 stop bit (*Smartcom*).

■ Once you know how to call MCI Mail through Tymnet, you know how to call any other system available on the service.

CALLING DOW JONES NEWS/RETRIEVAL AND OTHERS ON TYMNET Once you know how to call MCI Mail through Tymnet, you also know how to call any other system that's available through Tymnet. When Tymnet gives its "Please log in:" prompt, type the system name: DJNS for Dow Jones, COMPUSERVE for CompuServe, KI for Knowledge Index, and so forth. Tymnet will connect you to the appropriate computer. You will need a different password for each system, and you will have to register with each system separately.

You can, of course, create *Crosstalk* script files, *Smartcom* macro definition files, or *PC-TALK* function key definitions for each system. *PC-TALK* and a keyboard macro program such as *ProKey* or *Superkey* can partially automate your log-on much as a script file does: a batch file can load the macro program, which in turn starts *PC-TALK* and dials the service. You take over once the two systems connect.

PC MAGAZINE IRS In addition to commercial on-line systems, there are thousands of public-access bulletin board sys-

TEN ON-LINE SYSTEMS YOU SHOULD KNOW ABOUT

A listing of information, mail, and general-interest services.

On-line systems fall into three categories: information retrieval, electronic mail, and, for lack of a better name, general-interest utilities.

Information retrieval systems offer databases that may include the full text of journals, magazines, or reports but are more often limited to abstracts or bibliographic references.

■ Knowledge Index is an "after hours" version of DIALOG, a large system aimed at professional researchers. Knowledge Index is available evenings and weekends only but at a lower cost than DIALOG. It offers 35 of DIALOG's 260 databases, and it uses a simpler search language, making the system less powerful but far easier to learn and use. Subjects range from publishing to engineering, to general news and information. Sign-up charge is $35 with no minimum monthly fee. (Knowledge Index; DIALOG Information Services Inc. 3460 Hillview Ave., Palo Alto, CA 94304; (800) 3DIALOG)

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■ BRS/After Dark is another after-hours service, easier to use than its big brother BRS and less expensive. The range of subjects overlaps with Knowledge Index, and some of the databases are the same. The sign-up charge is $75 with a $12 monthly minimum. A related service is BRKTHRU, which uses the same menu-driven structure as BSR/After Dark but is available 22 hours a day. Evenings and weekends are at reduced rates but not as low as After Dark. BRKTHRU has a $75 sign-up charge but no monthly minimum. (BRS/After Dark; 1200 Rte. 7, Latham, NY 12110; (800) 345-4BRS)

CIRCLE 650 ON READER SERVICE CARD

■ NewsNet offers the electronic editions of 325 newsletters covering such diverse fields as advertising, aerospace, and real estate. NewsNet's best feature is its newsclipping service, which will read though newsletters as they are put on the system and will alert you to stories that contain specific key words. There is no sign-up fee, but there is a monthly minimum of $15. (NewsNet; 945 Haverford Rd., Bryn Mawr, PA 19010; (800) 345-1301; in Penn., (215) 527-8030)

CIRCLE 649 ON READER SERVICE CARD

Electronic-mail systems are in competition with the post office. Most are limited to storing and forwarding messages between subscribers, but at least two systems offer a more flexible approach.

■ MCI Mail offers several options for delivery. If the recipient isn't on MCI Mail, you can send a hard copy by regular mail or by courier. Courier costs for three pages are $8 for overnight delivery or $30 for 4-hour delivery in selected areas. First-class mail is $2 for three pages. For any printed-letter delivery, additional pages are $1 per three pages. Still another option is Telex. Electronic letters are 45 cents for a 500-character note, $1 for 7,500 characters, and $1 for each additional 7,500 characters. There is an $18 yearly fee, but no sign-up cost and no monthly minimum with the basic service. With advanced service, copies of your messages are retained for a week. (MCI Mail; 2000 M St. NW, Washington, DC 20036; (800) MCI-2255)

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(continues)

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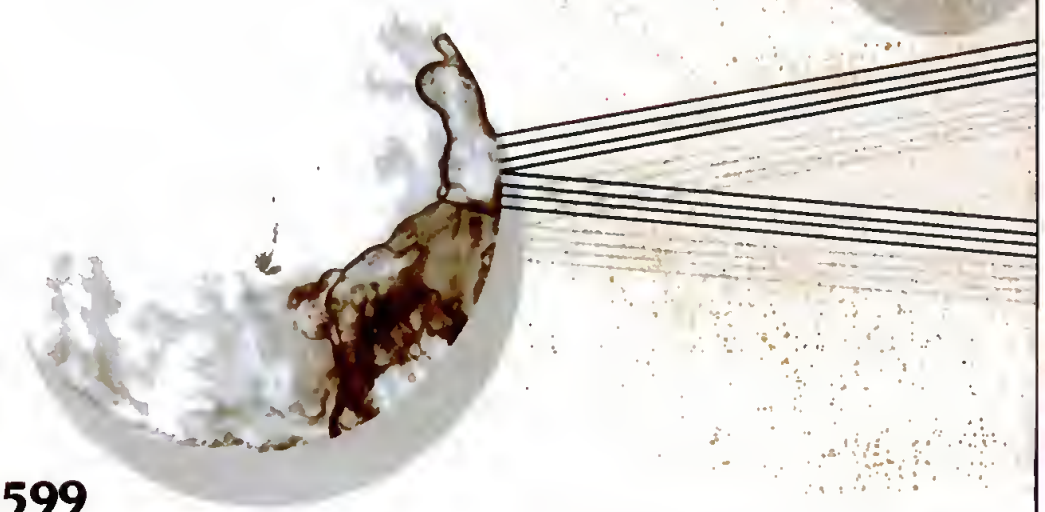

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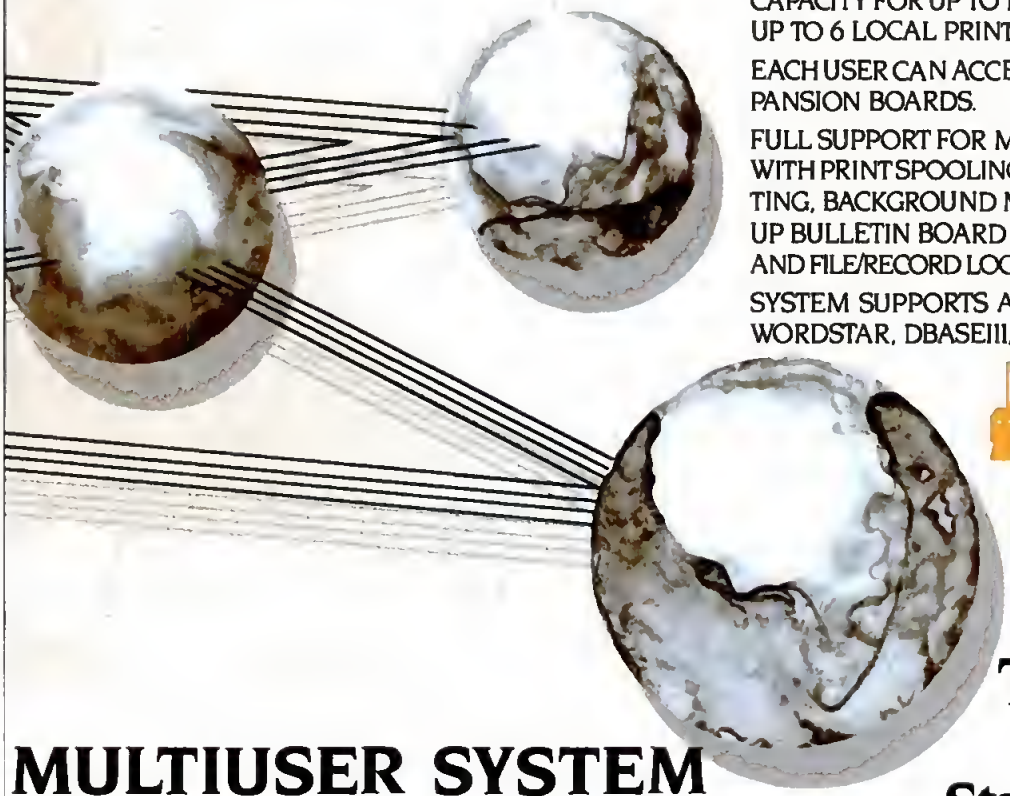

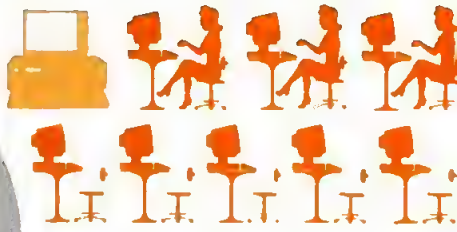

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SYSTEM SUPPORTS ALL POPULAR SOFTWARE SUCH AS WORDSTAR, DBASEIII, LOTUS 123, MULTIMATE, ETC.

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■ PC LAB NOTES

tems (BBSs) that you can use for just the price of a phone call. Most BBSs offer free software that you can download over the phone lines. (Download usually means something coming from a bigger computer or from the computer that has what you want; upload means from the smaller computer.)

PC Magazine's own Interactive Reader Service (IRS), at (212) 696-0360, is a good example. You'll find most programs that appear in *PC Magazine*'s Programming/Utilities column on this board as well as selected items from the Power User and User-to-User columns and an index to articles in *PC Magazine*.

CALLING THE INTERACTIVE READER SERVICE Calling the *PC Magazine* IRS is similar to calling MCI Mail. Set your communications software to 8 data bits, no parity, and 1 stop bit and then dial the number either from the keyboard or through the autodial feature. Because bulletin board systems have fewer phone lines than commercial systems, don't be surprised if you have to redial with attack dialing to get through. The *PC Magazine* IRS recently increased from 6 to 12 lines and by the time you read this, 18 lines should be active—but even with a dozen lines, more than 8,000 calls a day (many are autodial retries, of course) don't get through.

■ In addition to commercial on-line systems, there are thousands of public-access bulletin boards that can be used for just the price of a phone call.

When your modem establishes communications with the *PC Magazine* IRS, the board will ask you to press a key to begin. It will then give you current information about the board and ask you to enter your name, city, state, company name, job title, and phone number. The last question is "Expert (Y or N)?". Answer N to see the IRS menus.

Here again, you can follow the techniques already described in the preceding pages to automate the dialing and log-on procedure. And with that chore out of the way, you can concentrate on using the on-line system. PC

M. David Stone is a frequent contributor to PC Magazine.

("Ten On-Line Systems You Should Know About")

■ Western Union EasyLink is equivalent to MCI Mail, offering electronic mail, Mailgrams, telegrams, and Telex. EasyLink is more difficult to use than MCI Mail but offers some interesting extras. If a message hasn't been read after 9 days, for example, EasyLink will send it as a Mailgram. EasyLink has a $25 annual fee, with no sign-up fee or monthly minimum. (Western Union EasyLink; One Lake St., Upper Saddle River, NJ 07458; (201) 825-5000)

CIRCLE 647 ON READER SERVICE CARD

General-interest utilities include a mix of services.

■ CompuServe Consumer Information Service (CIS) is one of the best known of the general-interest systems. Services include general news and information, business and financial information, electronic mail (not as good as MCI's), and special-interest groups on a range of subjects. Sign-up is $39.95 with no monthly minimum. (CompuServe; 500 Arlington Centre Blvd., P.O. Box 20212, Columbus, OH 43220; (800) 848-8199 or (614) 457-0802 in Ohio)

CIRCLE 636 ON READER SERVICE CARD

■ CompuServe Executive Information Service is the business-oriented arm of CompuServe. EIS subscribers get all CIS features plus such premium services as a demographic database and an on-line brokerage firm. Sign-up charge is $70 with a $10 monthly minimum. Address and phone numbers are the same as for CIS.

CIRCLE 635 ON READER SERVICE CARD

■ The Source has much the same kinds of services as CompuServe but with different particulars. The news section, for example, offers the UPI newswire instead of AP. Business services include BIZDATE, short for business news updates. BIZDATE is updated throughout the day. Sign-up fee is $49.95, with a $10 monthly minimum. (The Source;1616 Anderson Rd., McLean, VA 22102; (800) 336-3366 or (703) 734-7500 in Va.)

CIRCLE 634 ON READER SERVICE CARD

■ Delphi is the littlest of the general-interest utilities. Much of its attraction lies in its potential. Still the new kid on the block, Delphi's services are more limited than those of The Source or CompuServe, but they are often more inventive. Sign-up fee is $49.95 with a manual or $29.95 without. (Delphi; General Videotex Corp.; 3 Blackstone St., Cambridge, MA 02139; (800) 544-4005 or (617) 491-3393 in Mass.)

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■ Dow Jones News/Retrieval puts its emphasis on news and on business and financial services. *Wall Street Journal* Highlights On-line offers news updated thoughout the day. You can search through back issues of *The Journal*, *Barron's*, and Dow Jones News Service. Other services include Corporate Earnings Estimator, The Forbes Directory, and Dow Jones stock quotes. Sign-up fee is $29.95, with no monthly minimum. (Dow Jones News/Retrieval; (800) 257-5114 or (609) 452-1511 in N. J.)

CIRCLE 632 ON READER SERVICE CARD

For the more popular services, you sometimes get reduced-rate or free sign-ups with some communications packages or modems. The services are more concerned about getting you to try them out than getting rich off the initiation fee.—**M. David Stone**

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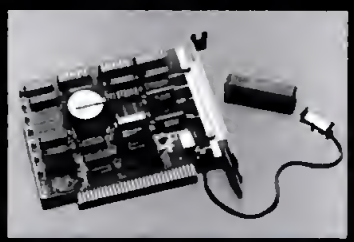

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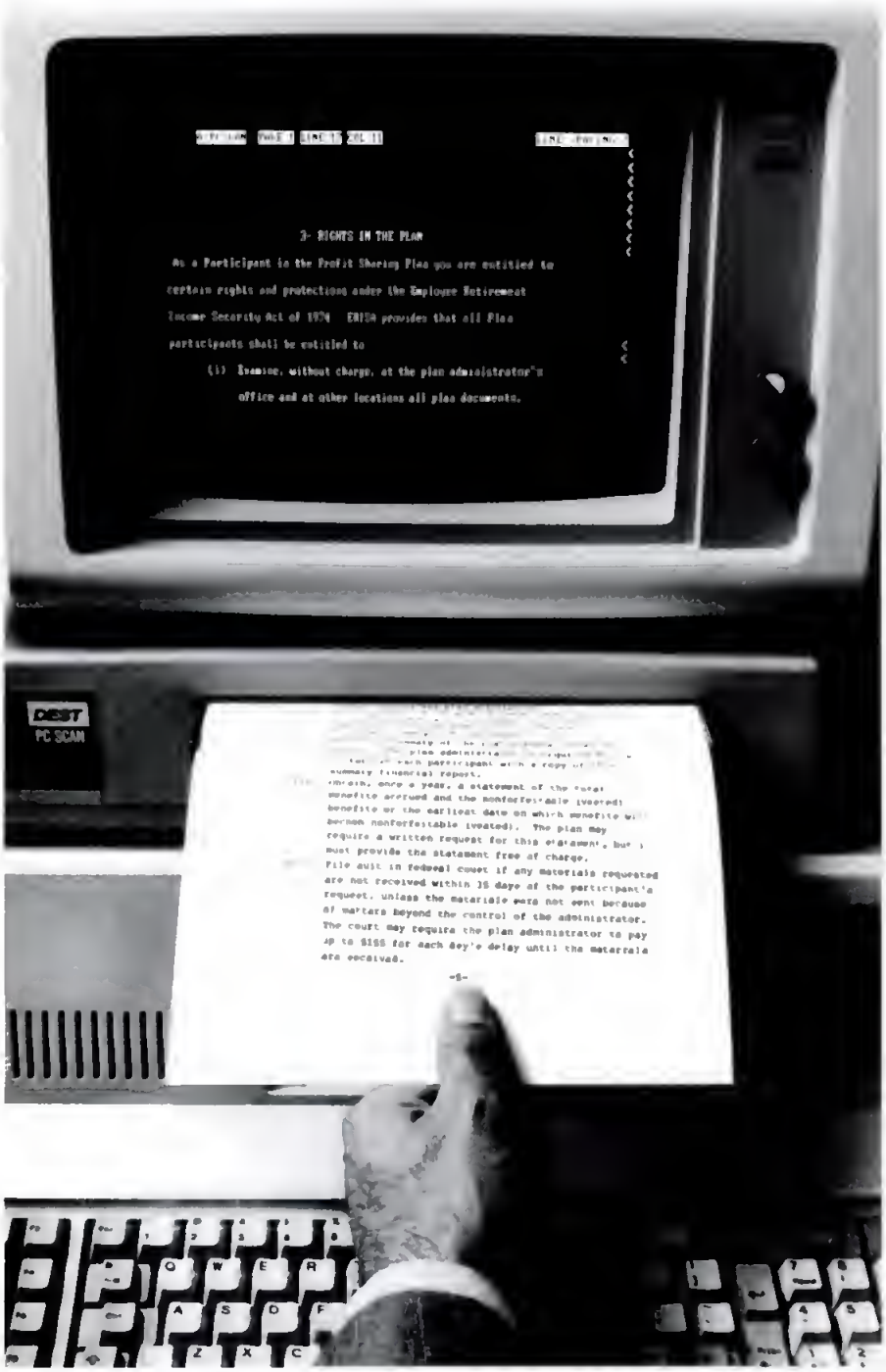

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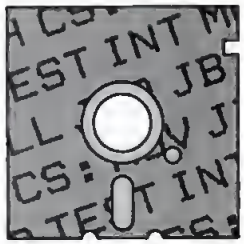
CIRCLE 285 ON READER SERVICE CARD

■ PROGRAMMING/UTILITIES ■ JOHN SOCHA

STATUS SYMBOLS FOR YOUR PC



Here's the way to give your NumLock, CapsLock, and ScrollLock toggle keys status indicators and learn about 26th-line programming as well.

Dearly as I love my IBM PC, there are still a few things about it that bother me. For example, the three toggle keys NumLock, CapsLock, and ScrollLock. You can't tell which state they're in. Are the cursor keys active or is the numeric keypad active? Have you hit the CapsLock key recently? I can never remember.

IBM corrected this in the PC AT, whose keyboard has a small light for each toggle key. But unfortunately, that doesn't provide much consolation when I have to use my old, reliable IBM PC (which is actually a Compaq Plus).

In this article, I'll show you how to remedy this lack with Statline, a small machine-language program that creates an extra line at the bottom of your screen. It uses this line to display three "lights," one for each of the three toggle keys, so you can always see exactly which state these three keys are in. And if you're a touch-typist like me, the status line on the screen is a lot better than lights on the keyboard. With Statline, I never have to take my eyes off the screen to see whether I left the CapsLock key on.

GETTING YOUR COPY There are several ways you can get a copy of STATLINE.COM. If you have a modem, you can simply call *PC Magazine*'s Interactive Reader Service at (212) 696-0360 and download STATLINE.COM, STATLINE.ASM, or STATLINE.BAS. If your communications program supports the Xmodem file transfer protocol, you can download STATLINE.COM directly. Otherwise, download STATLINE.ASM or STATLINE.BAS, which you can use to create STATLINE.COM.

If you don't have a modem, there's no way to avoid typing either the assembler program shown in Figure 1 or the BASIC program listed in Figure 2. If you have an IBM or Microsoft Macro Assembler, you then assemble Statline by the following steps:

```
;-------------------------------------------------------------------------;
; STATLINE, by John Socha, Copyright 1986 Ziff-Davis Publishing Co.       ;
;                                                                         ;
; Here are the two interrupt vectors that we take over.  The first        ;
; interrupt, INT 9, is the hardware interrupt for the keyboard, and       ;
; it's called every time you push or release a key.                       ;
;                                                                         ;
; The other interrupt, INT 10h, points to the ROM BIOS routines that      ;
; handle all of the screen I/O.  We intercept it so that we can watch     ;
; for commands to change the display mode.  Since STATLINE only works     ;
; in 80x25 text modes, STATLINE turns itself off as long as the screen    ;
; is in a different mode.                                                 ;
;-------------------------------------------------------------------------;
VECTORS         SEGMENT AT 0h
        ORG     9h*4
KEYBOARD_INT_VECTOR     LABEL   DWORD   ;Keyboard interrupt
        ORG     10h*4
VIDEO_IO_VECTOR         LABEL   DWORD   ;ROM BIOS Video I/O function calls
VECTORS         ENDS


;-------------------------------------------------------------------------;
; STATLINE uses the following flags from the ROM BIOS's data area to      ;
; control the screen.                                                     ;
;-------------------------------------------------------------------------;
ROM_BIOS_DATA   SEGMENT AT 40h
        ORG     10h
EQUIP_FLAG      DB      ?               ;Equipment installed
        ORG     17h
KBD_FLAG        DB      ?               ;Used to determine display type
        ORG     49h
CRT_START       DW      ?               ;Starting address in buffer
        ORG     63h
ADDR_6845       DW      ?               ;3d8 register, where x is B or D
ROM_BIOS_DATA   ENDS


;-------------------------------------------------------------------------;
; This section of the ROM in a COMPAQ contains the 6 bytes 'COMPAQ'       ;
; which we can use to identify a COMPAQ computer.  COMPAQ computers       ;
; have a display adapter that uses the monochrome display, but with       ;
; registers and memory the same as a color graphics adapter.              ;
;-------------------------------------------------------------------------;
COMPAQ_CO       EQU     4F43h           ;ASCII code of 'CO'

COMPAQ_SEG      SEGMENT AT 0F000h
        ORG     0FFEAh
COMPAQ_ID       DW      ?               ;We should find 'CO' (4F43h) here
COMPAQ_SEG      ENDS
```

(Figure 1 continues)

Figure 1: *The assembly language listing for STATLINE.COM.*

■ PROGRAMMING/UTILITIES

```
masm statline;
link statline;
exe2bin statline statline.com
```

Ignore the error message you get from LINK that says you don't have a stack. Alternatively, the BASIC program STATLINE.BAS creates the machine language program when you load and run it once in BASICA. It also does some error checking to make sure that the data is correct, in case you made a mistake typing in the data or your communications program dropped a few bits. Make sure that you use the same line numbers I used so that STATLINE .BAS can tell you which line numbers have errors.

DISPLAY ADAPTERS AND STATLINE

Statline works directly with the hardware of the display adapter in your computer, which means that the program won't work with all display adapters. I wrote Statline specifically for three such boards: the IBM Color/Graphics Adapter, the IBM Monochrome Display Adapter, and the Compaq's built-in adapter. If you've got any other display adapter, Statline may not work properly; in particular, the program doesn't work with IBM's Enhanced Graphics Adapter (EGA).

Statline, if it works on your display adapter, is very easy to use. You simply type STATLINE at the DOS prompt to load it into memory. It will stay there, working its magic, until the next time you start DOS. If you decide you want to use it all the time, just add the command line

```
STATLINE
```

to your AUTOEXEC.BAT file.

Two things happen when you run Statline. First, it displays the message "Installed Statline, by John Socha." This means that Statline has installed itself in memory and should now be working. The other change you should see is somewhat subtle. Statline changes the number of lines on the screen from 25 to 26 by adding more lines to the screen image you see. The end effect is that the original 25 lines are squeezed into a slightly smaller space. If you watch carefully, you'll see the whole screen "jump" up slightly when you install Statline.

Now push the CapsLock key. You

```
;-------------------------------------------------------------------------;
; Bere ie the STATLINE'e entry point.  It jumpa to the initializetion     ;
; routine wbich ie at the vary end so thet we can throw it out of         ;
; memory after we've used it.                                             ;
;-------------------------------------------------------------------------;
CODE_SEG        SEGMENT
        ASSUME  CS:CODE_SEG, DS:CODE_SEG
        ORG     100b            ;Reserve for DOS Program Segment Prefix
BEGIN:  JMP     INIT_VECTORE

AUTHOR_STRING           DB      "Inetelled Statline, by John Socha"
                        DB      0Ah, 0Ah, '$'

OLD_KBD_FLAG            DB      0       ;Rost recent upper nibble of etetus
VIDEO_MODE              DB      ?       ;Current video mode
STATUS_LINE_ENABLED     DB      1       ;0 when we're in graphics modes

;-------------------------------------------------------------------------;
; The following table contains the character/attribute pairs for the      ;
; stetes of the Scroll Lock, Num Lock, and Caps Lock keys.                ;
;                                                                         ;
; The first word contains the address for the character, and the second   ;
; word contains the character/attribute pair.                             ;
;-------------------------------------------------------------------------;
ENTRY   STRUC
OFFSET_FROM_TOP         DW      ?       ;Offset from start of display memory
ATTRIBUTE_CHARACTER     DB      ?       ;Attribute and character code
ENTRY   ENDS

FLAG_CHARACTER_TABLE    LABEL   WORD
        ENTRY   <0084,' '>              ;Scroll Lock, ' '
        ENTRY   <0084,12h>              ;Scroll Lock, double-ended arrow
        ENTRY   <0088,' '>              ;Num Lock, ' '
        ENTRY   <0088,23h>              ;Num lock, '#'
        ENTRY   <0076,' '>              ;Caps Lock, ' '
        ENTRY   <0076,18h>              ;Caps Lock, up arrow

ROM_KEYBOARD_INT        DD      ?
ROM_VIDEO_IO_INT        DD      ?

;-------------------------------------------------------------------------;
; Tbis procedure sends control off to the ROM BIOS routine, then checks   ;
; the shift-lock flags on return and writes the new flag characters to    ;
; the screen.                                                             ;
;-------------------------------------------------------------------------;
INTERCEPT_KEYBOARD_INT  PROC    FAR
        ASSUME  CS:CODE_SEG, DS:NOTHING
        PUSHF                           ;Simulate INT with PUSHF and CALL
        CALL    ROM_KEYBOARD_INT        ;Let ROM do the work
        CMP     STATUS_LINE_ENABLED,1   ;See if Status line enabled.
        JNE     NO_STATUS_LINE          ;Not enabled.
        CALL    CHECK_STATUS_FLAGS      ;Check flags and update status line
NO_STATUS_LINE:
        IRET
INTERCEPT_KEYBOARD_INT  ENDP


;-------------------------------------------------------------------------;
; This procedure checks the current setting of KBD_FLAGS against the      ;
; last setting, and if the flags have changed, it updates the status      ;
; line display.  Check_status_flags also updates Old_kbd_flag.            ;
;-------------------------------------------------------------------------;
CHECK_STATUS_FLAGS      PROC    NEAR
        PUSH    AX                      ;Save all the registers we use
        PUSH    BX
        PUSH    CX
        PUSH    DX
        PUSH    SI
        PUSH    DI
        PUSH    DS
        PUSH    ES
        ASSUME  CS:CODE_SEG, DS:ROM_BIOS_DATA
        MOV     AX,ROM_BIOS_DATA        ;Set DS so it points to BIOS data area
        MOV     DS,AX
        MOV     DX,ADDR_6845            ;Get the base address for the 6845
        MOV     AX,0B000h               ;Segment address of graphics adapter
        CMP     DX,3D0h                 ;Is this the color graphics adapter?
        JAE     IS_COLOR_BOARD      ;It's a color board, so don't change AX
        MOV     AX,0B000h           ;Segment address for monochrome adapter
IS_COLOR_BOARD:
        MOV     ES,AX                   ;Use extra segment for display memory

        ADD     DX,03DAh-0304h          ;Point to status register
        MOV     BL,KBD_FLAG             ;Get flag information
        MOV     CL,4                ;Put shift lock flags into lower nibble
        SHR     BL,CL
        ASSUME  CS:CODE_SEG, DS:CODE_SEG
        MOV     AX,CS                   ;Set DS to the local data (in CS)
        MOV     DS,AX
```

(Figure 1 continues)

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CIRCLE 187 ON READER SERVICE CARD

■ PROGRAMMING/UTILITIES

```
        CMP     BL,OLD_KBD_FLAG         ;Bava any of tha atatua flaga changed?
        JE      FLAGS_HAVENT_CHANGED    ;No, than do nothing
        MOV     OLD_KBD_FLAG,BL     ;Flaga hava changad, updata atatua line
        MOV     SI,Offset FLAG_CHARACTER_TABLE

        MOV     CX,3                    ;Repeat for thraa shift lock kaya
SHIFT_LOCK_LOOP:
        POSB    SI
        SBR     BL,1                    ;Get naat flag in carry
        JNC     READ_OFFSET             ;Flag waa 0, SI Ok
        ADD     SI,3                    ;Skip over information
READ_OFFSET:
        MOV     DI,[SI]                 ;Gat Offaat
        MOV     AL,[BI+2]               ;Gat charactar for thia flag

        POSB    CX                      ;Sava tha CX ragiatar
        MOV     CL,AL                   ;Sava tha charactar in CL
WAIT_FOR_NON_RETRACE:
        IN      AL,DB                   ;Raad atatus
        TEST    AL,8                    ;In horizontal ratraca?
        JNZ     WAIT_FOR_NON_RETRACE    ;Wait for horizontal ratraca to finiah
WAIT_FOR_RETRACE:
        IN      AL,DB                   ;Read atatua
        TEST    AL,8                    ;In horiaontal ratraca?
        JZ      WAIT_FOR_RETRACE        ;No, than wait for horizontal retraca
        MOV     AL,CL                   ;Gat tha charactar wa want to writa
        STOSB                           ;Writa charactar to tha acraan
        POP     CX                      ;Recover tha old valua of CX

        POP     SI
        ADD     SI,6                    ;Skip to naat pair of antriaa
        LOOP    SHIFT_LOCK_LOOP

FLAGS_HAVENT_CHANGED:
        POP     ES
        POP     DS
        POP     DI
        POP     SI
        POP     DX
        POP     CX
        POP     BB
        POP     AX
        RET
CHECK_STATUS_FLAGS      ENDP


;-------------------------------------------------------------------------;
; This procedura raprograma tha 6845 whanavar a program switchaa modaa    ;
; into an 80x25 taxt moda.                                                ;
;-------------------------------------------------------------------------;
INTERCEPT_VIDEO_IO      PROC    FAR
        ASSUME  CS:CODE_SEG, DS:NOTHING
        OR      AH,AH                   ;Chack if callad for SET MODE
        JZ      SET_MODE                ;It'a a SET MODE call
        JMP     ROM_VIDEO_IO_INT        ;Rot a SET MODE, call ROM BIOS
SET_MODE:
        MOV     VIDEO_MODE,AL           ;Sava new video moda
        MOV     STATUS_LINE_ENABLED,AH  ;Disabla STATLINE during moda changa
        PUSHF                           ;Simulata INT with POSHF, CALL
        CALL    ROM_VIDEO_ID_INT        ;Let ROM BIOS changa vidao moda
        CALL    REPROGRAM_6845          ;Craata 26th lina again
        MOV     OLD_KBD_FLAG,0          ;Flaga will ha claar in naw moda
        CALL    CHECK_STATUS_FLAGS      ;Make aura wa show currant flaga
        IRET
INTERCEPT_VIDEO_IO      ENDP


;-------------------------------------------------------------------------;
; Tha following tablaa deacribe how to raprogram tha 6845 ragiatara.      ;
; Each pair daacribaa how to changa ona ragiatar.  Tha firat number ia    ;
; tha ragiatar that wa want to raprogram, whila tha aacond numbar ia      ;
; tha naw valua for that ragiatar.  Reprogram_6845 atopa when it saaa      ;
; a 0 for tha ragiatar numbar.                                            ;
;-------------------------------------------------------------------------;
MONOCHROME_TABLE        LABEL   BYTE
        DB      4,26                    ;horizontal total, 26 linaa
        DB      5,3                     ;horiaontal total adjust, acan linaa
        DB      6,26                    ;horiaontal diaplayad, 26 linaa
        DB      7,26                    ;horizontal sync poaition, linaa
        DB      0                       ;End of Monochroma tabla

COLOR_GRAPHICS_TABLE:
        DB      6,26                    ;horizontal diaplayad
        DB      0                       ;End of color graphica adaptar tabla
```

(Figure 1 continues)

should see a small Up Arrow character appear in the center of the 26th line. NumLock and ScrollLock have their own characters. If you push these keys, you'll see a "#" character for NumLock, and a double-ended arrow for ScrollLock. These are the three status "lights" that I promised Statline would display.

WORDS OF WARNING Statline has a few quirks you should know about. Some of them you can prevent, and others are the result of IBM's hardware design.

First, while the program works on IBM's Monochrome Display Adapter, its success there is incomplete. The problem is that the IBM Monochrome Display Adapter doesn't have enough memory on board to display a full 26 lines. It has only enough memory to display the first 48 characters of the 26th line. So what does it do for the 32 characters on the rest of the 26th line? It uses the characters from the first line on the screen.

Short of switching to the Color/Graphics Adapter there's unfortunately no way around this problem. (The Hercules card exhibits the same difficulty, since it very faithfully emulates the Monochrome Display Adapter.) Statline works very well on both the Color/Graphics Adapter and the Compaq display adapter, however.

Most memory-resident programs check to see if they're already installed before they install themselves in memory. This is done both to keep from wasting memory with multiple copies of a program and to avoid problems that might occur if two copies are active simultaneously.

Statline, on the other hand, doesn't check to see if it's already in memory before it installs itself, which isn't a problem most of the time. Every time you install Statline, it will eat up another 832 bytes of memory and perhaps slow down keyboard input slightly, but for the most part you'll never notice it. Unless, that is, you've got Borland International's *SideKick* running on your system.

THE KICK ABOUT SIDEKICK Both because of its great popularity and because of the generic problem it creates (it's not unique to Statline), it's worth exploring what happens when you've got *SideKick* on your system. You can install as many

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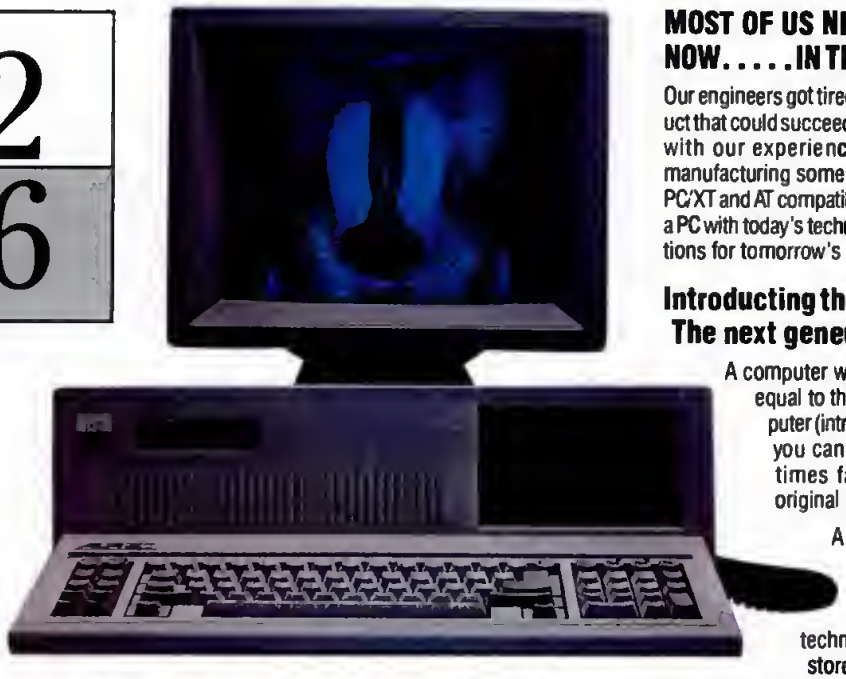

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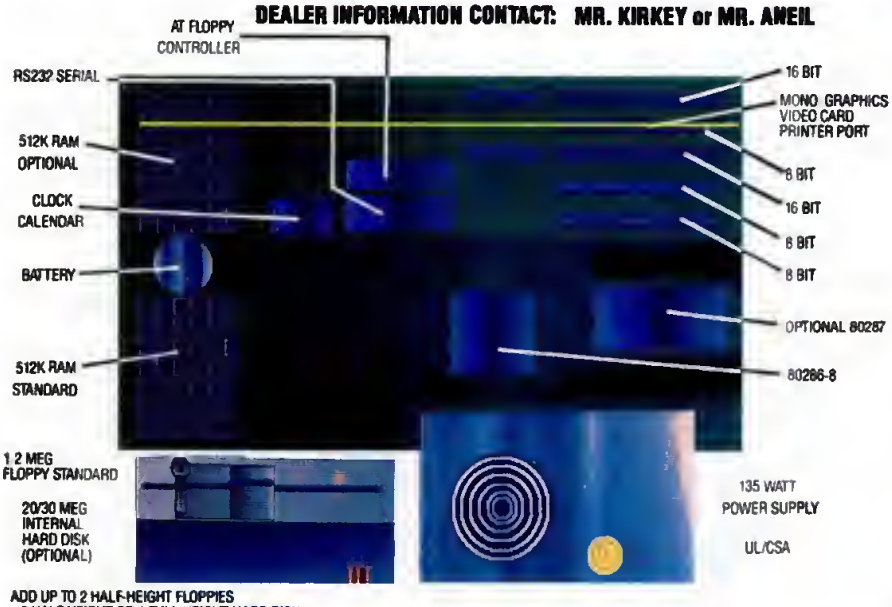

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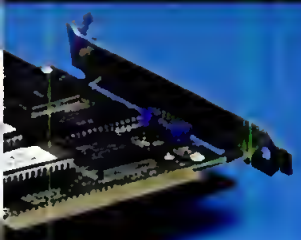

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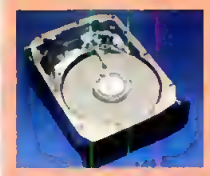

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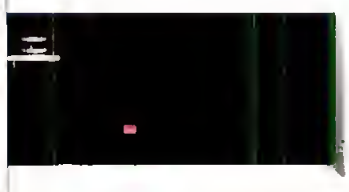

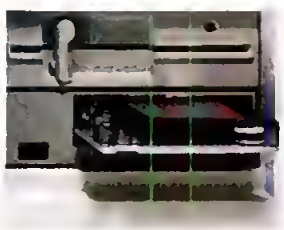

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■ PROGRAMMING/UTILITIES

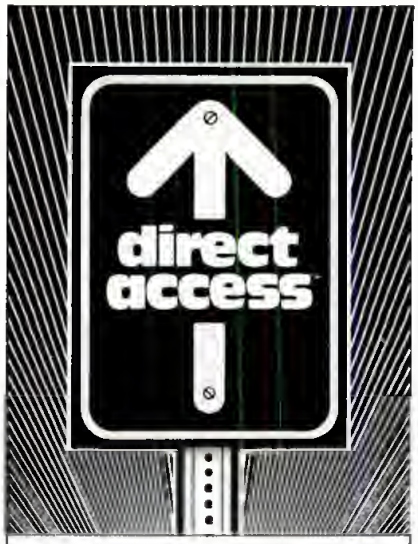
```
;-------------------------------------------------------------------;
; This procedure reprograme the 6845 eo thet it will ehow 26 rether ;
; then 25 linee.  It ueee the valuee from one of the tablee ebove.  ;
;                                                                   ;
; This procedure elso handlee the COMPAQ, which ie e epeciel ceee.  The ;
; COMPAQ ueee e monochrome-type diepley, eo it needs to be reprogrammed ;
; like e monochrome diepley, yet writee should be to 3Dxh registere ;
; rether then the 38xh regietere ueed for an IBM monochrome diepley. ;
;                                                                   ;
; P888:PFEA holde the word 'COMPAQ' on COMPAQ computere, so we can tell ;
; when we're running on e COMPAQ.                                   ;
;-------------------------------------------------------------------;
REPROGRAM_6845  PROC    NEAR
        ASSUME  CS:CODE_SEG, DS:CODE_SEG
        PUSH    AX
        PUSH    CX
        PUSH    DX
        PUSH    SI
        PUSH    DS
        MOV     AX,CS
        MOV     DS,AX                   ;Set up Date Seg
        MOV     STATUS_LINE_ENABLED,8   ;Initielly disahle etetue line
        MOV     AL,VIDEO_MODE           ;Check video mode
        CMP     AL,1                    ;In grephice mode?
        JLE     GRAPHICS_MODE           ;Yee, don't reprogram 6845
        CMP     AL,3                    ;Ie diepley in e text mode?
        JLe     TeXT_MODE               ;Yee, then we can reprogram 6845
        CMP     AL,7                    ;Ie it in the monochrome mode?
        JNE     GRAPHICS_MODE           ;No, then don't reprogram 6845
TEXT_MODE:                              ;Yee, reprogram 6845
        MOV     STATUS_LINE_ENABLED,1   ;Snahle etatue line in text modee
        MOV     SI,Offsat MONDCHROME_TABLE
        MOV     DX,3B4h                 ;6845 regietere for monochrome diepley
        PUSH    DS
        MOV     AX,ROM_BIOS_DATA        ;Reed equipment fleg from low memory
        MOV     OS,AX
        ASSDME  CS:CODE_SEG, DS:ROM_BIOS_DATA
        MOV     AL,EQUIP_FLAG
        AND     AL,38h                  ;Isolete CRT switchee
        CMP     AL,38h                  ;Ie it the monochrome diepley?
        POP     DS
        JS      SET_REGISTERS           ;Yee, the regietere ere correct
        MOV     OX,3O4h             ;No, set regietere for grephics edapter
        PUSS    DS
        MOV     AX,COMPAQ_SEG           ;Now check to see if thie ie e COMPAQ
        MOV     DS,AX
        ASSDME  CS:CODE_SEG, DS:COMPAQ_SEG
        CMP     COMPAQ_ID, COMPAQ_CO    ;Ie thie the 'CO' from COMPAQ?
        POP     DS                      ;Meetore old DS
        ASSUME  CS:CODE_SEG, DS:CODE_SEG
        JS      SET_REGISTERS           ;Ie e COMPAQ, uee monochrome date
        MOV     SI,Offeet COLOR_GRAPHICS_TABLE  ;No, uee color grephice date

SET_REGISTERS:
        CLD                             ;Clear direction fleg for increment
ADAPTER_LOOP:
        LODSB                           ;Get regieter number
        OH      AL,AL                   ;Are we et the end of the table?
        JS      END_OP_ADAPTER_TABLS    ;Yee, we're almoet done
        OUT     DX,AL                   ;No, select thie regieter
        INC     DX                      ;Point to date regieter
        LODSB                           ;Get new regieter value
        OUT     DX,AL                   ;Set the regieter to ite new value
        DSC     DX                      ;Point back to eddreee regieter
        JMP     ADAPTER_LOOP            ;Get the neet regieter/value pair

END_OP_ADAPTER_TABLE:
GRAPHICS_MODE:
        POP     DS
        POP     SI
        POP     DX
        POP     CX
        POP     AX
        RET
REPROGRAM_6845  ENDP


;-------------------------------------------------------------------;
; Thie procedure initielizee the interrupt vectore and the 6845     ;
; regietere.  It initielizee both the Nonochrome and color grephice ;
; edepter eddreee so it will work on the COMPAQ ee well ee IBN PCe  ;
;-------------------------------------------------------------------;
INIT_VECTOHS    PROC    NEAR
        ASSUME  CS:CODE_SEG, DS:CODE_SEG
        LEA     DX,AUTHOR_STRING        ;Print out the euthor notice
        MOV     AH,9                    ;Diepley thie etring
        INT     21h
```

(Figure 1 continues)



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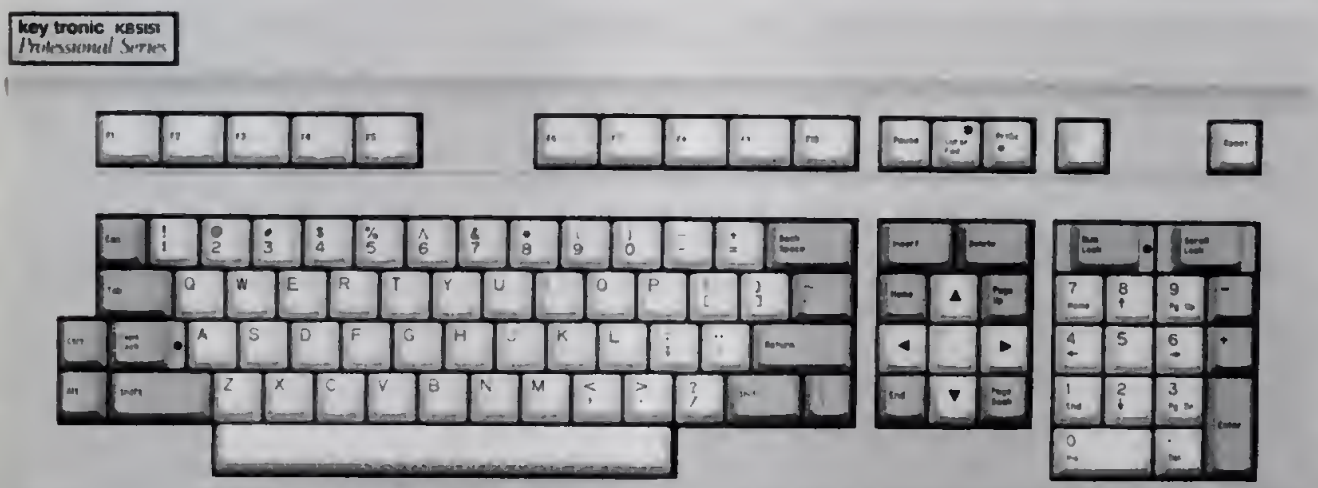

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■ PROGRAMMING/UTILITIES

```
        MOV     AH,15                   ;Check current video mode
        INT     10h                     ;Call VIDEO_IO ROM BIOS routine
        MOV     VIDEO_MODE,AL
        CALL    REPROGRAM_6845
        CALL    CHECK_STATUS_FLAGS      ;Display any flags now on

        ASSUME  CS:CODE_SEG, DS:VECTORS
        MOV     AX,VECTORS              ;Set up the data segment for vectors
        MOV     DS,AX
        CLI                             ;Don't allow interrupts

        MOV     AX,Word Ptr KEYBOARD_INT_VECTOR
        MOV     Word Ptr ROM_KEYBOARD_INT,AX
        MOV     AX,Word Ptr KEYBOARD_INT_VECTOR[2]
        MOV     Word Ptr ROM_KEYBOARD_INT[2],AX
        MOV     Word Ptr KEYBOARD_INT_VECTOR, Offset INTERCEPT_KEYBOARD_INT
        MOV     Word Ptr KEYBOARD_INT_VECTOR[2],CS

        MOV     AX,Word Ptr VIDEO_IO_VECTOR
        MOV     Word Ptr ROM_VIDEO_IO_INT,AX
        MOV     AX,Word Ptr VIDEO_IO_VECTOR[2]
        MOV     Word Ptr ROM_VIDEO_IO_INT[2],AX
        MOV     Word Ptr VIDEO_IO_VECTOR, Offset INTERCEPT_VIDEO_IO
        MOV     Word Ptr VIDEO_IO_VECTOR[2],CS

        STI                             ;Allow interrupts again
        MOV     DX,Offset INIT_VECTORS  ;End of resident portion
        INT     27h                     ;Terminate but stay resident
INIT_VECTORS    ENDP

CODE_SEG        ENDS

        END     BEGIN
```

(Figure 1 ends)

```
100 REM -- BASIC PROGRAM TO CREATE statline.COM
110 OPEN "statline.COM" AS #1 LEN = 1
120 FIELD #1,1 AS A$
130 CHECKSUM = 0
140 FOR I% = 1 TO  52
150     LINESUM% = 0
160     FOR J% = 1 TO 8
170         READ BYTE%
180         CHECKSUM = CHECKSUM + BYTE%
190         LINESUM% = LINESUM% + BYTE%
200         IF (BYTE% < 256) THEN LSET A$ = CER$(BYTE%)
210         PUT #1
220     NEXT J%
230     READ LINECHECK%
240     IF LINECHECK% <> LINESUM% THEN PRINT "Error in Line";200 + 10 * I%
250 NEXT I%
260 CLOSE
270 IF CHECKSUM = 37052 THEN PRINT "Successful Completion!" : END
280 PRINT "COM file is not valid!" : END
290 DATA    233,     60,      1,     83,    116,     87,    116,    100,    823
300 DATA    105,    110,    101,     44,     32,     88,    121,     32,    643
310 DATA     74,    111,    104,    110,     32,     83,    111,     99,    724
320 DATA    104,     97,     13,     10,     36,      0,      0,      1,    261
330 DATA    244,     15,     32,    244,     15,     10,    240,     15,    823
340 DATA     32,    240,     15,     35,    236,     15,     32,    236,    841
350 DATA     15,     24,      0,      0,      0,      0,      0,      0,     39
360 DATA      0,      0,    156,     46,    255,     30,     50,      1,    538
370 DATA     46,    120,     62,     31,      1,      1,    117,      3,    389
380 DATA    232,      1,      0,    207,     88,     83,     81,     82,    766
390 DATA     86,     87,     30,      6,    104,     64,      0,    142,    599
400 DATA    216,    130,     22,     99,      0,    104,      0,    104,    844
410 DATA    120,    250,    208,      3,    115,      3,    104,      0,    892
420 DATA    176,    142,    102,    131,    194,      6,    130,     30,   1000
430 DATA     23,      0,    177,      4,    210,    235,    140,    200,    909
440 DATA    142,    216,     58,     30,     20,      1,    116,     46,    630
450 DATA    136,     30,     29,      1,    100,     32,      1,    105,    604
460 DATA      3,      0,     86,    200,    235,    115,      3,    131,    701
470 DATA    198,      3,    130,     60,    130,     68,      2,     81,    609
480 DATA    138,    200,    236,    160,      0,    117,    251,    236,   1354
490 DATA    168,      0,    116,    251,    130,    193,    170,     80,   1133
500 DATA     94,    131,    100,      6,    226,    220,      7,     31,    913
510 DATA     95,     94,     88,     80,     91,     88,    105,     10,    752
520 DATA    228,    116,      5,     46,    255,     46,     54,      1,    751
530 DATA     46,    162,     30,      1,     46,    136,     30,     31,    498
540 DATA      1,    156,     46,    255,     30,     54,      1,    232,    775
550 DATA     22,      0,     46,    100,      6,     20,      1,      0,    302
```

(Figure 2 continues)

Figure 2: *A BASIC program that will create STATLINE.COM automatically.*

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■ PROGRAMMING/UTILITIES

versions of Statline as you like before you run *SideKick*. But once you have *SideKick* installed, you can install Statline only one more time. Installing Statline yet another time, or running a program like *XyWrite II* will lock your keyboard, so that you'll have to hit the big red power switch. That's very unfriendly, but, as you'll see, it makes a certain amount of sense.

SideKick is one of the few memory-resident programs that works with *XyWrite*. [XyWrite III *provides an additional file, XYKBD.COM, which makes it possible for* XyWrite *to tolerate many, but still not all, memory-resident programs—Ed.*] For those of you who haven't used *XyWrite*, let me say that it's a program that many people have called unfriendly. *XyWrite* takes complete control of the keyboard while it's running and doesn't let other programs, such as Statline, monitor the keyboard.

SideKick, on the other hand, performs some complicated gymnastics to retain control over the keyboard so that it can work inside unfriendly programs like *XyWrite*. Unfortunately, these same gymnastics cause problems with other memory-resident programs, such as Statline. Fortunately, there is a simple solution, namely, to do as Borland recommends and load *SideKick* last, after you have loaded every other memory-resident program, including Statline. Here's how *SideKick* causes the problems.

THE GYMNAST Programs such as *SideKick* and Statline attach themselves to the keyboard's hardware interrupt (Interrupt 9) so that they're called every time you push or release a key. Of itself, there's absolutely nothing wrong with doing this. But *SideKick* takes things a step further.

When *SideKick* sees that another program has taken over the keyboard interrupt vector, it assumes that you're running an unfriendly program like *XyWrite*, so it daisy-chains a special routine onto INT 9. This routine receives control as soon as you push or release a key, and it checks for the Ctrl-Alt key pair, then passes control on to whatever program took over INT 9. So far everything is fine.

But what happens if we try to daisy-chain yet another program onto the keyboard interrupt? Well, everything breaks loose. *SideKick* will take over the interrupt on the next timer tick, but it doesn't patch things up correctly. The end result is that your computer gets into an infinite loop and won't return unless you cycle the big red power switch. That's not very nice of *SideKick*.

```
500 DATA    232,   113,   255,   207,     4,    26,     5,     3,   845
570 DATA      0,    20,     7,    26,     0,     6,    20,     0,    97
580 DATA     80,    81,    82,    80,    30,   140,   200,   162,   841
590 DATA    216,   190,     6,    31,     1,     0,   100,    30,   642
600 DATA      1,    80,     1,   126,    69,    80,     3,   126,   446
610 DATA      6,    60,     7,   117,    61,   190,     6,    31,   606
620 DATA      1,     1,   190,   220,     1,   106,   100,     3,   782
630 DATA     30,   104,    84,     0,   142,   210,   100,    16,   812
640 DATA      0,    36,    40,    60,    40,    31,   116,    21,   300
650 DATA    106,   212,     3,    30,   104,     0,   240,   162,   997
660 DATA    216,   129,    62,   234,   255,    67,    79,    31,  1073
670 DATA    116,     3,   190,   229,     1,   252,   172,    10,   973
680 DATA    192,   116,     7,   230,    66,   172,   230,    74,  1103
690 DATA    235,   244,    31,    96,    90,    89,    80,   195,  1086
700 DATA    141,    22,     3,     1,   100,     9,   205,    33,   594
710 DATA    180,    15,   205,    16,   102,    30,     1,   232,   841
720 DATA    142,   255,   232,   239,   254,   104,     0,     0,  1380
730 DATA    142,   210,   250,   101,    30,     0,    40,   103,  1014
740 DATA     50,     1,   161,    30,     0,    46,   103,    52,   511
750 DATA      1,   199,     6,    30,     0,    50,     1,   140,   441
760 DATA     16,    30,     0,   161,    66,     0,    66,   103,   486
770 DATA     56,     1,   161,    66,     0,    46,   103,    56,   547
780 DATA      1,   199,     6,    64,     0,   103,     1,   160,   594
790 DATA     14,    80,     0,   251,   106,    72,     2,   205,   790
800 DATA     39,     0,     0,     0,     0,     0,     0,     0,    39
```

(Figure 2 ends)

Let's take a detailed look at what goes wrong. *SideKick* has two routines that daisy-chain onto the INT 9 vector, which I'll call SKIntercept and SKSteal. SKIntercept is the routine that *SideKick* daisy-chains onto the INT 9 vector when you install *SideKick*. This is the procedure that normally does all the work.

Things change, however, if you run a program that attaches itself to the INT 9 vector. *SideKick* checks the INT 9 vector on every timer tick to make sure that it's still installed. If it finds that some other program has taken control of the INT 9 vector, it daisy-chains the second routine SKSteal onto the INT 9 vector.

■ *SideKick* and Statline attach themselves to the keyboard's hardware interrupt so that they're called every time you push or release a key.

Now, as a concrete example, let's say that we installed Statline after we installed *SideKick*. In that case an INT 9 interrupt would traverse the following path. First it calls SKSteal, since this is the vector that *SideKick* most recently installed. SKSteal, in turn, calls the procedure that was installed before. In this case, it's Statline, which we just installed. Statline, in turn, calls the routine that was installed before Statline appeared on the scene. In other words, it calls SKIntercept. And finally, SKIntercept passes control onto the ROM BIOS routine. Everything works, albeit in a strange way.

Now let's install Statline a second time and call it Statline2. *SideKick* will see on the next timer tick that it's lost control of INT 9 and daisy-chain SKSteal onto INT 9. Unfortunately, this routine was installed on INT 9 just before Statline2 installed itself. So an INT 9 calls SKSteal, which calls Statline2. Statline2 calls whatever routine was installed before it arrived, which happens to be SKSsteal, and we're back where we started. We have a deadlock loop that's impossible to get out of. If this all sounds rather confusing, then you've got a pretty good idea of how your computer feels when this happens.

As I indicated previously, however, installing *SideKick* after every other memory-resident program eliminates this problem, though the need to do so also points to the desirability of establishing standards for memory-resident programs.

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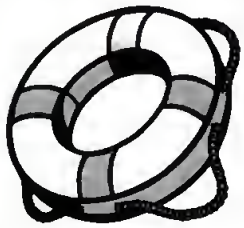

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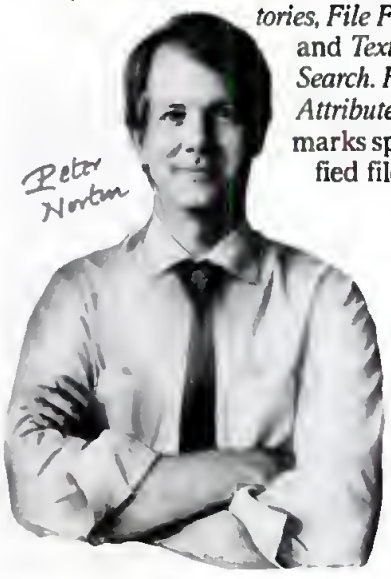

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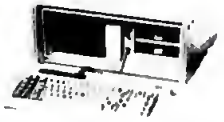

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■ PROGRAMMING/UTILITIES

INSIDE STATLINE Those of you who aren't interested in how Statline works can skip the rest of this article. In it we'll look at the internal workings of Statline.

The procedure REPROGRAM_6845 changes the registers of the 6845 display controller so that it will display 26 rather than 25 lines on the screen. Reprogramming the 6845 is a fairly simple task and is done by the 10 lines of code starting at ADAPTER_LOOP. So why is REPROGRAM_6845 so long? That's so it can handle three types of display adapter.

Let's take a detailed look at REPROGRAM_6845. The first thing this procedure does is check to see if the status line is active. Statline monitors the video mode of the display and disables the status line whenever you enter a graphics mode. It enables the status line again whenever you switch back to one of the 80-column text modes. So the first few lines of REPROGRAM_6845 check to see if the display is in an 80-column text mode. If not, it returns without changing the display.

■ Compaq uses a display that fools programs into thinking you have a Color/Graphics Adapter.

The code starting at TEXT_MODE checks to see which display adapter you're using. There are two pieces of information we need here. First, we need to know the base address of the 6845. This is straightforward for both the Monochrome and Color/Graphics adapters, but not for the Compaq adapter. Compaq uses a display that has the same character set as a Monochrome Display Adapter, but it fools programs into thinking you have a Color/Graphics Adapter. However, the 6845's control registers are at the address used for a Monochrome Display Adapter, so we have to use the 3Dxh registers rather than the 3Bxh registers.

There are two tables that describe how to reprogram the 6845 registers, called MONOCHROME_TABLE and COLOR_GRAPHICS_TABLE. The first number of each table is the register we need to change; the second is the new value for each register. The remaining details of REPROGRAM_6845 are made clear by the comments in the program listing.

CHECK_STATUS_FLAGS is the procedure that checks the status flags each time you press or release a key on the keyboard. To keep from creating snow on the display, CHECK_STATUS_FLAGS waits for horizontal retrace periods before writing to screen memory. Because of this, however, actually writing to the screen every time you push or release a key would slow down keyboard input considerably. So, in the interest of speed, CHECK_STATUS_FLAGS updates the screen only when the flags for the three toggle keys change.

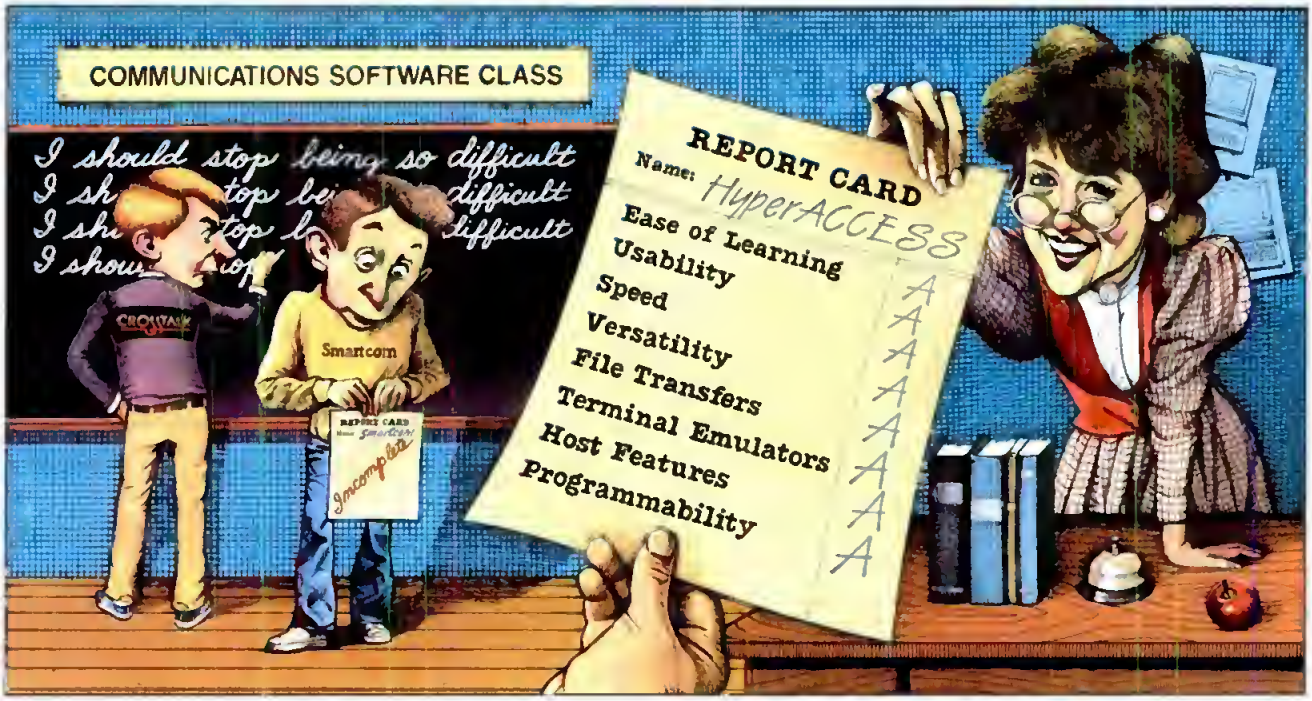
The loop SHIFT_LOCK_LOOP writes out the characters for all three toggle keys, using information in the table FLAG_CHARACTER_TABLE. This table contains pairs of numbers that describe where and what character to use for each flag. Each flag has two pairs of numbers, one for each state of the key.

The first number is an offset from the start of screen memory where we should write the character, and the second number is the character that we should write. You can see that the first character in each pair is a space, which means that we won't see anything.

Finally, one last note. Statline intercepts the ROM BIOS's Video_IO routine so that it can see when you change video modes. Every time you change modes, Statline does one of two things. If you change into a graphics or 40-column mode, Statline disables CHECK_STATUS_FLAGS so that it won't write to the screen. In the other case, when you switch to an 80-column text mode, Statline first calls the ROM BIOS routine to switch modes, and then reprograms the 6845 so you have a status line again. ■

John Socha is a veteran programmer and an occasional contributor to PC Magazine.

Correction: Please check the Letters column in this issue for an important correction to the Programming/Utilities column by John Friend in Volume 5 Number 10.



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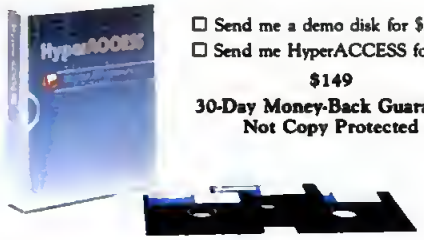

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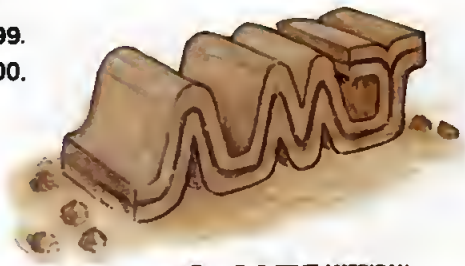

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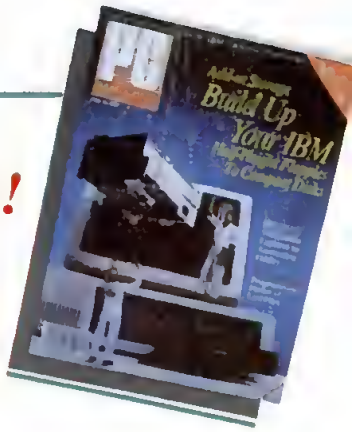

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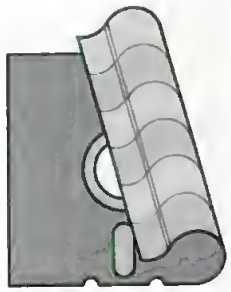

Lotus tips that let you pick your type font, dish up better menus, invert column data, and better control your cursor and your defined ranges.

FONT MENU

Figure 1 contains a menu that lets you insert text of various kinds into a *1-2-3* worksheet. Alt-C runs the macro and gives you a control panel choice of condensed, bold, underlined, or subscript text. Hit the first letter of your menu choice, type the text you want in that font, and hit Return.

The macro uses the extended ASCII characters that represent the control codes for turning fonts on and off. These are the peculiar characters that appear in line 5 of the screen shot; they must be entered into your spreadsheet via one of the ways outlined in previous issues of Spreadsheet Clinic. Each character cluster in line 5 contains the codes that turn the special font on and off and has the range name that's in the cell above it. Cell B9 is named CHAR.

The macro works by copying the codes to wherever your cursor is, going into edit mode, and then moving the cursor to the point just after the turn-on-font code and just before the turn-off-font code. Now, whatever you type will be sandwiched between the correct codes for the font you chose.

The example shows control codes for the Epson/IBM printer. Codes will, of course, be different for different printers.

Arnold Moskowitz
Philadelphia, Pennsylvania

This menu makes it easy to jazz up a worksheet with fancy printing. A macro menu can have up to eight choices, but this one has only five because that number fits nicely on the screen. If you wanted many different printing options, you could include a final menu choice that brought up another menu.

Different techniques for getting unusual ASCII characters into a 1-2-3 *spreadsheet are explained in* PC Magazine*'s Spreadsheet Clinic of October 29, 1985 (Volume 4 Number 22), and February 25, 1986 (Volume 5 Number 4). The trick is to create an ASCII file containing the characters you want, give it a .PRN extension, and /File Import it into your worksheet.*

INVERTING DATA IN COLUMNS

Figures 2 and 3 show a way to invert data in a *Symphony* or *1-2-3*, Release 2, column without writing a macro. The entries in cells D9 to D19 will always appear in reverse order in cells E9 to E19. They may be labels or numbers. In this example I have used a series of random numbers in D, which are reversed in E. Every time you hit F9 (Calc) you will get a new series.

This inversion technique will work with a column of any length, so long as it lies between A and Z. Named ranges are as follows: Start = D6, Count = E6, Range1 = the column of data to be inverted. The formula that does the real work is the one in E9, which is copied down to E19. The formulas in Count and Range could easily be

Figure 1: *A font menu for* 1-2-3 *that sends the necessary printer codes to your printer. Note the use of the extended ASCII character set in line 5.*

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■ SPREADSHEET CLINIC

```
                D            E
-----------------------------------------------------
 3   Data Inveraion Formula
 4
 5                 Start       Count
 6   @CELL("row",RANGE1)    @COUNT(RANGE1)
 7
 8                Range1     Inverse
 9       @INT(10*@RAND)           4
10       @INT(10*@RAND)           6
11       @INT(10*@RAND)           4
12       @INT(10*@RAND)           7
13       @INT(10*@RAND)           7
14       @INT(10*@RAND)           3
15       @INT(10*@RAND)           3
16       @INT(10*@RAND)           7
17       @INT(10*@RAND)           7
18       @INT(10*@RAND)           2
19       @INT(10*@RAND)           2

Formula in cell E9:

@@(@CHAR(@CELL("col",!D9)+64)&@STRING($COUNT+2*$START-@CELL("row",!D9)-1,0))
```

Figure 2: *The formulas for data inversion.*

```
          D       E
-------------------------------
 3   Data Inversion Formula
 4
 5      Start     Count
 6        9        11
 7
 8     Range1   Inverse
 9        9       3
10        4       4
11        9       1
12        3       0
13        1       1
14        6       6
15        1       1
16        0       3
17        1       9
18        4       4
19        3       9
```

Figure 3: *The order of the data in column D is automatically reversed in column E.*

included in the formula in E9, but I have broken them out here for clarity.

Charles Parkhurst
Bronxville, New York

What the long formula in cells E9 through E19 does is produce the address of the appropriate cell in column D. (The formula would be more general if it used Range1 instead of !D9, but I shortened it to fit on the page.) The @@(at the beginning of the formula returns the contents at that address, and @cell("col",!D9)+64 gives the column letter. The +64 converts from column numbers, which @cell gives you, to column letters. The part of the formula after the &, which gives you the row number of the cell in D to be displayed in E, is more complicated. It's based on a row-number algorithm that looks simple once somebody else has figured it out, but could be very hard to invent on your own: Take the row number at which the column to be inverted begins and multiply by 2. Add the number of entries in the row, subtract the row number of the cell in E, and subtract 1. Pretty slick, Mr. Parkhurst.

BETTER MENUS

Here are some tips for creating better *1-2-3* macro menus:

1. *1-2-3* accepts a space as a valid menu item. Since the space is invisible when the menu is displayed, you can use it for a "hidden" menu selection. Of course, if you cursor to it across the menu line, it will become visible. However, if the description is also only a space (and therefore invisible) and the selection is the last menu item, many users will never notice its presence.

2. If you add spaces before or after the label for a menu item, you will have put more space between the label and the other menu items. This is a good way to set apart a more important command from other items in the menu.

3. You can use all characters, including punctuation marks, as menu items. Thus, if you have menu choices that call up help screens, a question mark (?) makes a good menu item.

4. Normally, as the user cursors through the menu, the description labels in the second line appear at the left edge of the screen. However, if you begin the description labels with leading spaces, they will appear right under the menu item to which they apply. This associates the description more closely with the menu item.

5. When a macro calls a menu, the top line of the screen shows the current cursor position and the contents of the current cell. This extraneous information can confuse users, so it's a good idea to send the cursor to a blank cell before you call a menu.

6. Finally, it's not necessary for every menu item to lead to a detailed macro. You can use at least one item to tell the user where he is, as in a menu like this:

```
CALC   SAVE   EXTRACT   PRINT     <--- Menu 1
```

If the user mistakenly chooses the "<--- Menu 1" item, it can lead to a /xm command that calls the same menu.

Daniel Ehrmann
Chicago, Illinois

■ The row-number algorithm looks simple once somebody else has figured it out, but could be very hard to invent on your own.

GETTING RID OF RANGES

When I build a spreadsheet with Release 2 of *1-2-3*, I define a lot of range names. As I go along, I sometimes find I have defined ranges I no longer need. The macro shown in Figure 4 displays all the defined ranges in the worksheet and lets me delete any or all of them.

To use it, put the cursor in any part of the spreadsheet where there is room to build a range name table and hit Alt-B. Move the cursor to a range name you no longer need and hit Enter. The macro will let you go on deleting ranges until you hit Enter with the cursor on a blank cell. Thus, when you get to the last name to delete, just hit Enter twice to end the macro.

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```
\B        NAME~{right}                    Make column
          ADDRESS~{left}{down}              headings.
          /rnt~                          Make range name table.
LOOP      {?}                              Wait for input.
          {if @cellpointer("type")="b"}{quit}  Quit if empty.
          /c~BLANK~                          Copy range name to BLANK.
          /rnd                           Begin deletion.
BLANK     ~                                Left blank for range name.
                                             Complete deletion.
          /re{right}~                      Erase table entry.
          {branch LOOP}                  Go back to LOOP.
```

Figure 4: *A macro that builds a table of range names and deletes those you indicate.*

REPEATING KEYSTROKES IN MACROS

In *1-2-3*, Release 2, when you move the cursor around with macros, you can include repeat counts. The entry {right 4}, for example, will move the cursor to the right four times. I have found that you can also use a range name or formula to indicate how many times you want to move the cursor. Thus, {right COUNT}, for example, will move the cursor as many times as the value in the cell named COUNT. A formula such as {right COUNT-1} will also work. When your macro operates on different columns, it can be handy to be able to move different distances according to the status of the spreadsheet.

John Spear
Bedford, Texas

This is yet another undocumented Lotus goodie. Since the number of repetitions can be the result of any formula that returns a number, you can write things like

```
{up @max(e7..e14)/@avg(d30..d46)}
```

or

```
{right @if(a1>b1,c1,d1)}
```

However, unless these formulas return nice positive integers, they may not behave the way you suspect. The repetition count doesn't distinguish between positive and negative numbers, so {right -4} moves the cursor right four times, not left four times. Also, it throws away everything after a decimal point. So {right 3.99999} moves the cursor three times, not four.

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Sort on indexed field	4:42	>60:00*	13:08	10:19	7:52
Count to 5000	4:10	9:04	9:43	11:35	18:51

(all times in minutes:seconds) *test terminated after one hour

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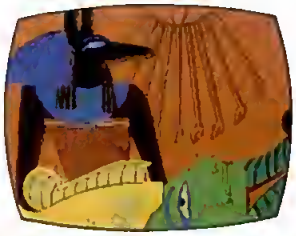

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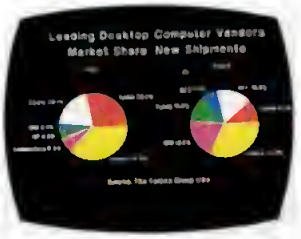

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■ EDITED BY CRAIG L. STARK

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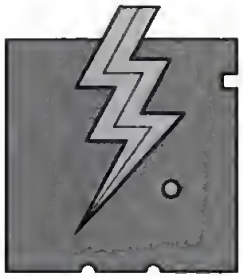

A dBASE *program that automatically strips extraneous comments that waste execution time, and a word-processing macro technique that lets you write in shorthand.*

DCRUNCH FOR PROGRAM SPEED

In both "Pseudo compiler for *dBASE II*" (Power User, *PC Magazine*, Volume 5 Number 5) and "*dBASE* Speed Tips" (Power User, Volume 5 Number 1), the point is made that *dBASE* programs will execute faster if leading and trailing spaces, blank lines, and "*" lines are stripped out and if everything (except quoted text) is capitalized.

To facilitate the necessary file preparation, I'm enclosing dCRUNCH.BAT (see Figure 1) and dSTRIP.COM (see Figures 2 and 3), which will convert a 64K command file in under 6 seconds. Before running programs through the DOS filter, you should edit out any single apostrophes inside NOTE or TEXT/ENDTEXT statements, since capitalization is based on *pairs* of apostrophes, double quotes, or brackets. Note also that everything inside a TEXT/ENDTEXT statement will be capitalized and left-justified unless you first enclose it in quotes, then edit out the quotes later.

The syntax for the command is

```
DCRUNCH [d:][path]filename
```

and you should omit the .PRG filename extension.

Lutz Bungart
Seattle, Washington

All of us who suffer from manic "ASAPitis"—that is, every power user—will want to try dCRUNCH to make loop-intensive dBASE *routines run faster.*

dBASE*'s interpreter is its weakest link—or, more precisely, its slowest. When a command is issued, the interpreter: (1) parses the full command line; (2) discards leading spaces; (3) indexes to the first space to identify the verb; (4) truncates the string if it's longer than four characters; (5) converts it to uppercase; (6) searches its lookup table of initial verbs; and, finally, (7) gets down to business. So if you write a long NOTE or "*" comment, the interpreter looks at every byte, savors a delicate sample, then spits it out. The same applies when you add a comment after ENDIF or ENDDO, or when you indent command lines for legibility. It's no wonder that interpreted languages like dBASE or BASIC run more slowly than compiled programs!*

For example, take this simple iterative loop:

```
variable_x=0
DO WHILE variable_x<1000
     variable_x=variable_x+1
     * Tbis is a long comment line
     * explaining wbat's going on
ENDDO
```

dCRUNCH shortens processing of this loop over 25 percent—from 58 to 42 seconds. The biggest offender is the "" line—13 seconds; a long comment tacked on to the ENDDO will have the same effect. Shortening "variable_x" to "x" shaves another 6 seconds. (Timings using an AT were three to four times faster, but in the same approximate proportions.)*

Blank lines are curious beasts! While I found no measurable difference in execution speed with one blank line added, a large overhead began accumulating with each additional blank. Five blank lines in-

```
ECHO OFF
REM dCRUNCH.BAT    Speeds dBASE routines.   Calls dSTRIP.COM
IF %1/==/ GOTO noparm
IF NOT EXIST dstrip.com GOTO nocom
IF EXIST %1.prg GOTO strip
ECHO -----
ECHO Fils %1.PRG not found.
IF EXIST %1 ECHO Plssss specify ths file without .PRG sxtension.
GOTO noparm
:strip
IF NOT EXIST %1.prk GOTO work
ECHO -----
ECHO A back-up fils %1.PRK alrssdy exists and will be ovsrwrittsn.
ECHO Eit CTRL-BREAK followed by Y to intsropt or
PAUSE
DEL %1.prk
:work
ECHO Strsamlining %1.prg.  Original vsrsion is saved ss %1.prk
REN %1.prg %1.prk
dstrip <%1.prk >%1.prg
GOTO end
:noparm
ECHO FORMAT:     DCRUNCH [d:][path]filename     (omit ".prg")
GOTO end
:nocom
ECHO Fils DSTRIP.COM not found.
:end
```

Figure 1: *dCRUNCH.BAT invokes dSTRIP.COM to streamline* dBASE *programs.*

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creased the execution time of 1,000 loops by 11 seconds. I suspect the delay is not in processing the blanks, but rather in refinding the DO WHILE.

The easiest way to get dCRUNCH .BAT and dSTRIP.COM is to use your modem and call PC Magazine*'s Interactive Reader Service, (212) 696-0360. (Use 300 or 1,200 bps, eight data bits, no parity, and one stop bit.) If you have a macro as-*

```
;-------------------------------------------------------------------------
;DSTRIP - Dos Filter to remove leading and trailing blanks, blank lines and
;         command lines, from Dbase command files, and to capitalize text
;         not in quotation marks.
;-------------------------------------------------------------------------
COMSEG  SEGMENT PARA PUBLIC 'CODE'
        ASSUME  CS:COMSEG,DS:COMSEG,ES:COMSEG,SS:COMSEG
        ORG     100H

START   PROC    FAR
        CLD
        MOV     BL,00000001B    ;the bits in the BL register will hold the
                                ;following information when set to 1:
                                ;0-bit  only tabs and blanks encountered
                                ;       in current line
                                ;1-bit  a '*' encountered as first char of line
                                ;4-bit  char inside 'single' quotes
                                ;5-bit  char inside "double" quotes
                                ;6-bit  last char was LF
                                ;7-bit  last char in *-line was a ';'
        XOR     DX,DX           ;DX will count blanks/tabs after a char
LOAD:   PUSH    BX              ;save registers and
        PUSH    DX
        MOV     DX,OFFSET DATA  ;read into memory
        MOV     CX,64000        ;64K bytes
        XOR     BX,BX           ;from standard input
        MOV     AH,3FH          ;with DOS function call
        INT     21H
        POP     DX              ;restore registers
        POP     BX
        OR      AX,AX           ;AX has number of bytes read - test for 0
        JNZ     LOAD0
        JMP     DONE
LOAD0:  MOV     CX,AX           ;move count into CX
        MOV     SI,OFFSET DATA  ;and position index registers for
        MOV     DI,OFFSET DATA  ;a string move
SCAN0:  LODSB                   ;fetch a byte into AL
        CMP     AL,26           ;end of file?
        JE      STORE           ;if so, store and get out
        TEST    BL,01000000B    ;LF on previous fetch?
        JE      NEXT            ;if not, skip
        OR      BL,1            ;set beginning of line bit
        AND     BL,10111111B    ;and reset the LF bit
        TEST    BL,10000000B    ;a ';' at end of line?
        JNZ     NEXT0           ;if yes, skip
        AND     BL,11111101B    ;otherwise reset '*'-bit
NEXT0:  AND     BL,01111111B    ;reset ';'-bit
NEXT:   CMP     AL,59           ;a ';'?
        JNZ     NEXT1           ;if not, skip
        OR      BL,10000000B    ;set ';'-bit
        JMP     SHORT NEXT5     ;and do loop routine
NEXT1:  CMP     AL,32           ;blank?
        JZ      COUNT           ;if yes, check whether to count it
        CMP     AL,09           ;tab?
        JNZ     NEXT2           ;if not, skip count
COUNT:  TEST    BL,1B           ;are we at beginning of line or in a '*'- line?
        JNZ     LOOP            ;if yes, loop and omit
        INC     DX              ;otherwise count the blank/tab
        JMP     SHORT STORE     ;and store it
NEXT2:  CMP     AL,13           ;CR?
        JZ      OUT             ;if yes go to end of line routine
NEXT3:  CMP     AL,10           ;LF?
        JNZ     NEXT4           ;if not, go on checking
        OR      BL,01000000B    ;set end of line bit
        JMP     SHORT OUT       ;and go to end of line routine
NEXT4:  TEST    BL,1            ;have we seen any non blank/tab char before?
        JZ      NEXT6           ;if yes, ignore the next step
        CMP     AL,42           ;a '*'?
        JNZ     NEXT5           ;if not' skip
        OR      BL,10B          ;otherwise set the '*'-bit
NEXT5:  AND     BL,11111110B    ;and in either case we have non blank/tab char
NEXT6:  XOR     DX,DX           ;set blank/tab count to 0
OUT:    TEST    BL,1B           ;are we at beginning of line or in a '*'-line?
        JNZ     LOOP            ;if so, ignore (includes CR/LF of blank lines)
        SUB     DI,DX           ;DX is non-zero only if we encountered a CR
        XOR     DX,DX           ;reset DX to 0
        AND     BL,01111111B    ;reset ';'-bit
```

(Figure 2 continues)

Figure 2: *The assembly language program for dSTRIP.COM*

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```
CAPS0:  JMP     SHORT CAPS          ;capitalize
STORE:  STOSB                       ;store char
LOOP:   CMP     AL,26               ;test for end of file
        LOOPNZ  SCAN0               ;and loop for next fetch
        PUSH    AX                  ;save registers
        PUSH    BX
        PUSH    DX
        MOV     DX,OFFSET DATA      ;compute the numbers of bytes stored
        MOV     CX,DI
        SUB     CX,DX               ;in CX, and
        MOV     BX,01               ;write to standard output
        MOV     AH,40H              ;with DOS function call
        INT     21H
        POP     DX
        POP     BX
        POP     AX
        CMP     AL,26               ;end of file?
        JZ      DONE
        JMP     LOAD                ;if not, read another 64K bytes
DONE:   INT     20H                 ;end program

CAPS:   CMP     AL,39               ;single quote?
        JNZ     QUOT                ;if not check double quote
        TEST    BL,10000B           ;is double quote bit set?
        JNZ     STORE               ;if yes, ignore
        XOR     BL,01000B           ;(re-)set single quote bit
        JMP     SHORT STORE
QUOT:   CMP     AL,34               ;double quote?
        JNZ     CAPS01              ;if not, skip
        XOR     BL,00100000B        ;(re-)set double-quote bit
        JMP     SHORT STORE
CAPS01: TEST    BL,00110000B        ;any quote-bits set?
        JNZ     STORE               ;if so, don't capitalize
CAPS1:  CMP     AL,97               ;below 'a'?
        JB      STORE               ;if so, leave it alone
CAPS2:  CMP     AL,122              ;above 'z'?
        JA      STORE               ;if so, don't change
CAPS3:  AND     AL,5FH              ;otherwise capitalize
OUT2:   JMP     SHORT STORE
START   ENDP
DATA:
COMSEG  ENDS
        END     START
```

(Figure 2 ends)

```
N DSTRIP.COM
A
CLD
MOV     BL,01
XOR     DX,DX
PUSH    BX
PUSH    DX
MOV     DX,01CX
MOV     CX,PA00
XOR     BX,BX
MOV     AH,3F
INT     21
POP     DX
POP     SX
DR      AX,AX
JNZ     011C
JMP     01A4
MOV     CX,AX
MOV     SI,01CE
MOV     DI,01C8
LODSB
CMP     AL,1A
JZ      0184
TEST    BL,40
JZ      013F
OR      BL,01
AND     BL,BP
TEST    BL,80
JNZ     013C
AND     BL,FD
AND     BL,7F
CMP     AL,3S
JNZ     0140
OR      BL,80
```

(Figure 3 continues)

```
JMP     0171
CMP     AL,20
JZ      0150
CMP     AL,09
JNZ     0158
TEST    BL,03
JNZ     0185
INC     DX
JMP     0184
CMP     AL,0D
JZ      0176
CMP     AL,0A
JNZ     0165
OR      BL,40
JMP     0176
TEST    BL,01
JZ      0174
CMP     AL,2A
JNZ     0171
DS      BL,02
AND     BL,FE
XOR     DX,DX
TEBT    BL,03
JNZ     0185
SUB     DI,DX
XOR     DX,DX
AND     BL,7F
JMP     01A6
STOSB
CMP     AL,1A
LOOPNZ  0124
PUSH    AX
PUSH    BX
PUSH    DX
```

(Figure 3 continues)

Figure 3: *This file will create dSTRIP.COM through DEBUG.*

sembler, you can type in the dSTRIP .ASM file (Figure 2), then assemble, link, and EXE2BIN it. As an alternative, type up the shorter dSTRIP.INP file (Figure 3)

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```
MOV     DX,01CE
MOV     CX,DI
SUB     CE,DX
MOV     BX,8001
MOV     AH,40
INT     21
POP     DX
POP     BX
POP     AX
CMP     AL,1A
JZ      01A4
JMP     0105
INT     20
CMP     AL,27
JNZ     01B4
TEST    BL,20
JNZ     0104
XOR     BL,10
JMP     0104
CMP     AL,22
JNZ     01BD
XOR     BL,20
JMP     0104
TEST    BL,30
JNZ     0104
CMP     AL,61
JB      0104
CMP     AL,7A
JA      0104
AND     AL,5F
JMP     0104
RCX
0CE
W
Q
```

(Figure 3 ends)

■ If you need maximum speed inside an intensive loop, dCRUNCH is just the ticket.

with an ASCII word processor. Then use DEBUG to create dSTRIP.COM by issuing the command

```
DEBUG <DSTRIP.INP.
```

DEBUG will use dSTRIP.INP as its input to create the .COM file.

dCRUNCH's side effects are substantial. A program that is all-capitalized and left-justified without comments or mnemonic variable names is awful to read and a nightmare to modify 6 months later. And, in most applications, a few extra milliseconds inside a loop is the least of your problems. But if you need maximum speed inside an intensive loop—like passing each record in a file—dCRUNCH is just the ticket.—Brad Stark

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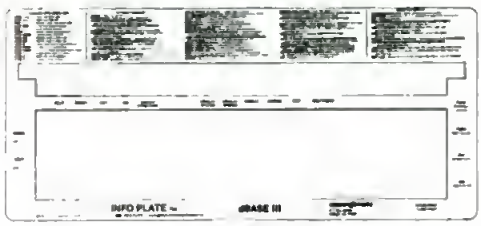

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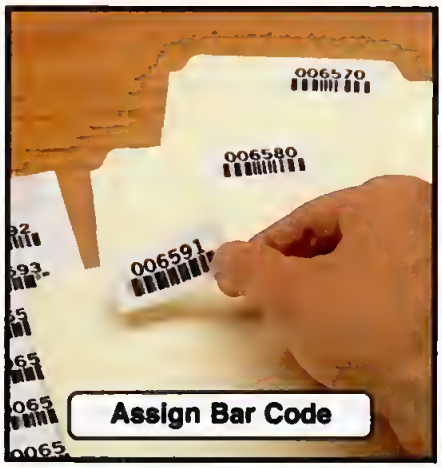

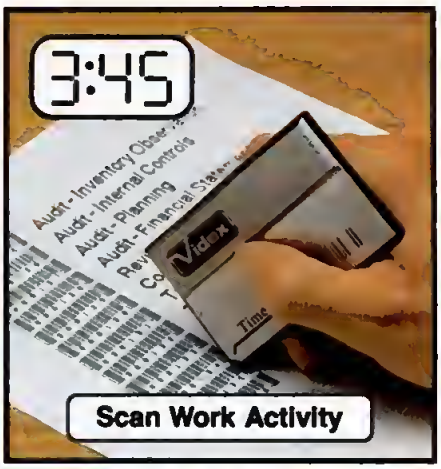

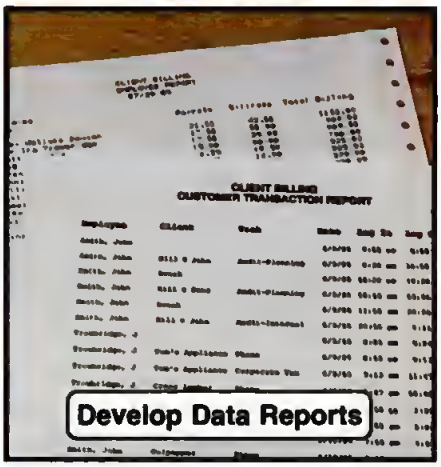

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commands appropriate for your word processor, and it will have to include a separate search-and-replace command for each common abbreviation you use. Be sure to start each abbreviation with a special character, such as a "*", ";" or ".", that would not normally occur at the beginning of a word. This will insure against the accidental replacement of a word in the middle of a word.

As an added advantage, you can use this "all-purpose prepare for printing" macro to insert or remove temporary comments, spell-check the document, or even to run other macros. One user who has a Tandy Model 100 portable uses this trick to mark up his document with his own format notes as he types it in. He then ships the text to his PC via RS-232 cable and uses a macro to convert his notes into format codes that his word processor can use.

One problem with this method is updating or adding to your list of abbreviations.

■ Electronic shorthand certainly works if you can remember the abbreviations.

In *WordPerfect*, the only way to change a macro is to rewrite it. However, Satellite Software International sells *M-Edit*, a macro editor that works much like the word processor and makes macro editing easy. (An older version of *M-Edit* is available for free from the SSI Users RBBS. Write to P.O. Box 1577, Baltimore, MD 21203 for a subscription form.) The other problem is remembering to run the macro. It can be embarrassing at best to send out a letter with the abbreviations still in it.

Dr. Harvey E. Summers
Columbia, Missouri

This electronic shorthand certainly works if you can remember the abbreviations. It's probably most helpful when using macro programs like Prokey, *which make it easy to edit the macro files. In any case, f u cn rd ths, u cn prbly us ths mcro shthnd trk.*—M. David Stone

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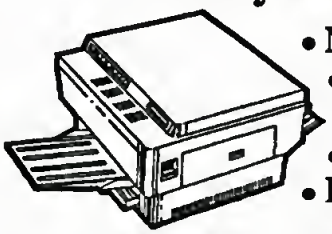

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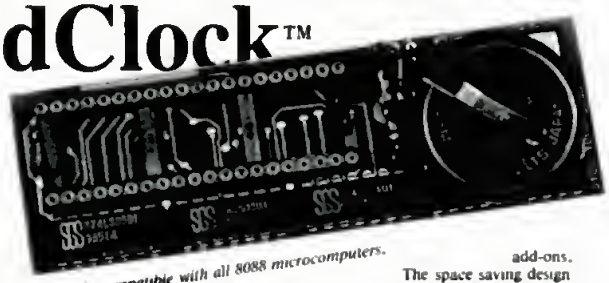

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■ EDITED BY PAUL SOMERSON

USER-TO-USER

Techniques for saving and loading screen images efficiently, changing DOS colors, deleting files with ease, and avoiding exponentiation traps.

SELECTIVE BSAVE/BLOADS

Most users who BSAVE and BLOAD BASICA screens do so a full screen at a time, but it can be very handy to do it in smaller pieces. The LITLBSAV.BAS program in Figure 1 BSAVEs a little piece of the screen (three lines) and then lets the user BLOAD it back in various places up and down the screen. This technique works very well off a RAMdisk or hard drive but is slow when run from a floppy disk.

Thomas VanderMeulen
Phoenix, Arizona

We adapted Mr. VanderMeulen's program so it BSAVEd three lines (a line of text with a blank line above and below) and let users move the BSAVEd block up and down the screen. (Including blank lines above and below the printed line effectively erases existing printed lines on-screen.) In line 120 the program determines whether the system is monochrome (where PEEK(1097)=7) or not, and in line 130 sets the segment to &HB800 for color or &HB000 for mono. Color systems offer four screen pages, 0 through 3. If you have a color system, you can increase the upper limit in line 200 to 3680 and make the text temporarily "disappear."

The nice thing about this technique is that it lets you "pop" up text onto existing screens. However, it won't restore the existing part of the screen it covers over. Still, by BSAVEing portions of screens and BLOADing them at the appropriate locations, you save disk space and make the BLOAD operation a little faster.

Since color screen memory is not duplicated (as mono memory is), you'll see "chatter" or "snow" while the BLOAD is occurring. Most snow we've seen is white, so by setting a white (7) background we cover most of it up. This will run slower on a diskette system unless you hit the Up and Down Arrow keys rapidly enough to keep the floppy spinning constantly. These days you can buy slow hard disks for a lot less than $500. Or stock up on system RAM and try this in a RAMdisk.

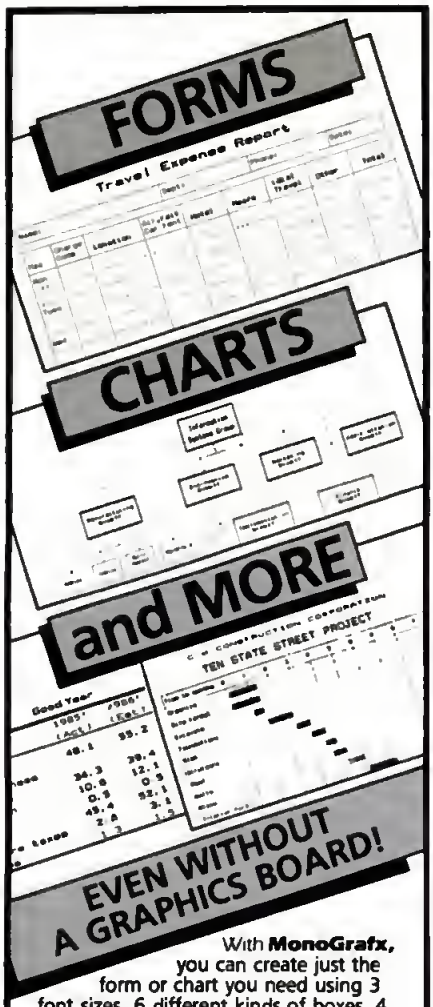
Mr. VanderMeulen originally submitted a long table showing the beginning and ending offsets for each line on the screen, but we turned this information into the

```
100 ' LITLBSAV.BAS -- by Thomae VenderMeulen -- edepted by PC
110 DEFINT A-Z:CLEAR:S$=STRING$(4,205)
120 DEF SEG=0:IF PEER(1097)=7 THEN SG=&HB000 ELSE SG=&SB000
130 DEF SEG=SG:KEY OFF:SCREEN 0,0:COLOR 4,7,6:CLS:LOCATE 2,1,0
140 PRINT S$;" Thie BLOADS e line et e time (hit ";CHR$(24);" end ";
150 PRINT CHR$(25);" keye to move, or ESC to end) ";S$
160 BSAVE "TEST.SCR",0,480:CLS:S=3680:GOTO 210
170 I$=INKEY$:IF I$="" THEN 170 ELSE IF I$=CHR$(27) THEN LOCATE 1,1:END
180 I=INSTR("SP",RIGHT$(I$,1)):IF I=0 OR LEN(I$)=1 THEN BEEP:GOTO 210
190 IF I=1 THEN IF S<0 THEN BEEP:GOTO 170 ELSE S=S-160:GOTO 210
200 IF S>3520 THEN BEEP:GOTO 170 ELSE S=S+160
210 SLOAD "TEST.SCR",S:GOTO 170
```

Figure 1: *Program to BSAVE less than a full screen (three lines in this example), and then let the user selectively BLOAD it back anywhere. The DEF SEG=0:PEEK(1097) in line 120 tells the program whether the system is color or mono and the IF...THEN in the same line sets the segment accordingly.*

```
100 'BSAVCALC.BAS -- For smell BSAVE/BLOADe -- by PC
110 DEF FNST$(Z)=MID$(STR$(Z),2+(Z<0)):Q$=CHR$(34):CLS
120 PRINT "Pick one: 1--BSAVE  2--BLOAD  (1 or 2)"
130 I$=INKEY$:IF I$="" TSEN 130 ELSE IF I$=CHR$(13) THEN END
140 IF INSTR("12",I$)=0 THEN 130 ELSE I=VAL(I$)
150 IF I=2 THEN B$="BLOAD " ELSE B$="BSAVE "
160 PRINT CHR$(30);B$;"informetion:";STRING$(20,32)
170 INPUT "Enter e etert line from 1-25: ",S1
180 IF S1<1 OR S1>25 THEN BEEP:GOTO 170
190 IF I=2 THEN PRINT:PRINT "For line";S1:GOTO 230
200 INPUT "Enter a stop line from 1-25: ",S2
210 IF S2<1 OR S2>25 OR S2<S1 THEN BEEP:GOTO 200
220 PRINT:PRINT "For line(e)";S1;"to";S2
230 OFFSET=(S1-1)*160:LENGTH=(S2*160)-OFFSET
240 PRINT "Offeet =";OFFSET:IF I=2 THEN 260
250 PRINT "Length =";LENGTH
260 PRINT "Syntex = ";B$;Q$;"filename";Q$;",";
270 PRINT FNST$(OFFSET);:IF I=2 THEN 290
280 PRINT ",";FNST$(LENGTH);
290 PRINT:PRINT:PRINT STRING$(40,61):PRINT:GOTO 120
```

Figure 2: *Program to calculate the offset and length for BSAVEs (and the offset for BLOADs) less than a full screen in size.*



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■ USER-TO-USER

BSAVCALC.BAS program in Figure 2.

The PC text screen memory is arranged so that each character takes up 2 bytes—one representing the actual character, and one for the character's attribute. The default text screen is 80 characters wide, so each 80-wide line in memory takes up 160 bytes. Color memory begins at segment &HB800, mono memory at &HB000. You tell BASICA which segment you want with the statement DEF SEG=&HB800 or DEF SEG=&HB000. BSAVE needs to know three things—the filename it will use to store the screen on your disk, the "offset" (distance in bytes up from the segment specified by DEF SEG), and the length of the file to save. Line 1 goes from offset 0 to offset 159, line 2 from 160 to 319, etc. All BLOAD needs to know is the filename and offset, not the length.

COLOR GENERATOR

The COLOR.BAS program in Figure 3 creates a .COM program that sets foreground, background, and border colors.

Jozef H. Khoe
Visalia, California

Yes, another color-setting program. Previous submissions have used OUT commands; this one doesn't. Mr. Khoe's original program let users change color settings by brute force; we modified it to make it easy to operate and menu-driven, with all choices listed on the screen. We're aware that it doesn't let users rename the .COM file it creates, but we didn't want it to get too long.

SWITCH HITTER

Some people prefer the UNIX standard of "/" for a directory separator and "-" for a command switch. Making the change is simple, using the undocumented DOS Function Call 37. All you have to do is change the switch character from "/" to "-". Type in the script in Figure 4 and call it SCRIPT. Then put any version of DEBUG 2.0 or later on your disk, and type DEBUG<SCRIPT to create the file. To use, type SWITCHAR X, where X is the new switch character. Or just type SWITCHAR to reset the switch to the normal /. For instance, if you type

```
SWITCHAR -
```

you can then get a paused directory listing by typing

```
DIR -P
```

instead of DIR /P.

Mark Lawrence
El Toro, California

Using nondocumented calls can create problems. IBM removed its own SWITCHAR config function from DOS; if you feel the need to reconfigure your switch character, you'll be experimenting at your own risk.

```
100 ' COLOR.BAS -- BY JOE KHOE -- adapted by PC Magazine
110 DIM C$(36):KEY OFF:SCREEN 0:COLOR 7,1,1:LOCATE ,,0:CLS
120 T$="0123456789AaBbCcDdEeFf":FOR A=1 TO 36:READ A$:C$(A)=A$:NEXT
130 FOR A=1 TO 8:READ H$:PRINT H$;:READ H$:PRINT TAB(20);H$:NEXT
140 LOCATE 20,1:PRINT "Thia creates COLOR.COM (hit ESC to raatart)."
150 FOR A=10 TO 14:LOCATE A,1:PRINT STRING$(39,32):NEXT
160 LOCATE 10,1:PRINT "Enter a 1-character border color:"
170 I$=INKEY$:IF I$="" TBEN 170 ELSE IF I$=CHR$(27) THEN 150
180 IF INSTR(T$,I$)=0 THEN 170 ELSE LOCATE 10,35:PRINT I$
190 LOCATE 11,1:PRINT "Enter a 1-character foreground color:"
200 J$=INKEY$:IF J$="" THEN 200 ELSE IF J$=CHR$(27) THEN 150
210 IF INSTR(T$,J$)=0 THEN 200 ELSE LOCATE 11,39:PRINT J$
220 LOCATE 12,1:PRINT "Enter a 1-character background color:"
230 LOCATE 13,1:PRINT "(Anything higher than 7 will blink)"
240 K$=INKEY$:IF K$="" THEN 240 ELSE IF K$=CHR$(27) THEN 150
250 IF INSTR(T$,K$)=0 OR K$=J$ THEN 240 ELSE LOCATE 12,39:PRINT K$
260 C$(6)=I$:C$(23)=K$+J$:OPEN "COLOR.COM" AB 1 LEN=1:FIELD 1,1 AS B$
270 FOR A=1 TO 36:LSET H$=CHR$(VAL("&H"+C$(A))):PUT 1:NEXT
280 CLS:LOCATE 1,1:PRINT "COLOR.COM creatad":CLOSE:END
290 DATA B4,0B,B7,00,B3,01,CD,10,B6,00,B8,8E,D8,BE,00,00,B9,D0
300 DATA 07,C6,44,01,17,83,C6,02,49,85,C9,75,F4,H8,00,4C,CD,21
310 DATA BLACK------0,GRAY-------8,HLUE-------1,BI BLUE----9
320 DATA GREEN------2,HI GREEN---A,CYAN-------3,BI CYAN----B
330 DATA RED--------4,HI RED-----C,MAGENTA----5,HI MAGENTA-D
340 DATA BROWN------6,YELLOW-----E,WHITE------7,HI WHITE---F
```

Figure 3: *Program to create COLOR.COM program that sets colors in DOS (or in BASIC, using SHELL"COLOR).*

```
N SWITCHAR.COM
A
JMP 0120
DB  'Switch character is now "/"',0D,0A,'$'
MOV DL,[0080]
CMP DL,00           ; did get command argument?
JZ  012F
MOV DL,[0082]       ; yes, use it as switchar
JMP 0131
MOV DL,2F           ; no, use / (2F) as switchar
MOV AX,3701         ; AL=1 for setchar from DL
INT 21              ; set the switchar
MOV DI,0102
MOV [DI+19],DL      ; modify the message
MOV DX,DI
MOV AH,09
INT 21              ; tell user what we did
INT 20              ; and exit

RCX
45
W
Q
```

Figure 4: *Instructions for creating SWITCHAR.COM program to substitute a character in place of the "/" for the command line switch. Type this in using a pure-ASCII word processor such as EDLIN, or WORDSTAR's n mode—and name it SCRIPT. You can ignore anything after the semicolons if you want. Make sure DEBUG.COM (Version 2.0 or later) is on your disk or that you've PATHed to it. Also, make sure you leave a space before the RCX, and hit the Enter key after each line, especially the last one. Then get into DOS and type DEBUG<SCRIPT to create the file. To use, type SWITCHAR X, where X is the new switch character. Or just type SWITCHAR to reset the switch to the normal /. Note: This process uses a nondocumented DOS function call (37), so experiment at your own risk.*

EASY TIME

Recently I noticed that some users were entering the time of day by simply typing a 9 or a 14 so they didn't have to go through the tedious process of finding the colon on the keyboard. I thought that there must be a better approximation, perhaps by typing 9.5 to get 9:30. Much to my surprise, the time stamp was 9:05. This definitely made life much simpler. To verify that perhaps I had missed something for the last 3 years and through two versions of DOS, I tested the 9.5 on DOS 2.1 and was awarded with an invalid time error. I couldn't find an earlier version, so I don't know if a period rather than a colon is unique to DOS 3.1.

Thomas J. Jones
Aptos, California

The trick of just typing in the hours is well documented in the DOS manuals. So are the allowable delimiters. In Version 2.x colons were the only acceptable delimiters

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■ USER-TO-USER

between hours, minutes, and seconds, and you had to use a period if you were specifying hundredths of a second. DOS 3.x allowed either a colon or a period between hours, minutes, and seconds—and either a period or a comma for hundredths (does anyone really set hundredths?), depending on the country setting. It's all in the manual, folks.

MASS DELETES

If there is a computing corollary to Parkinson's Law, it must be that "the number of files expands to fill the space available." I used to think that 10 megs would be sufficient, but now that I've upgraded to a 30-meg hard disk, it won't be too long until I've filled that up, if I'm not careful.

It's easy to mass-erase unwanted files by using the ERASE command with ? and * wildcard characters. This works fine if the multiple files have some common elements to their names or extensions, but to erase multiple files without common portions of the names, you normally have to issue the ERASE command once for each file you want to gid rid of.

To get around this problem, and to make it easier to erase several files with one command, I created the following DELETE.BAT batch file:

```
ECHO OFF
:LOOP
IF !%1 == ! GOTO ALLDONE
IF EXIST %1 GOTO OKFILE
ECHO File %1 not found...
GOTO GOON
:OKFILE
ERASE %1
:GOON
SHIFT
GOTO LOOP
:ALLDONE
```

To use DELETE.BAT, type the files you want to erase after the DELETE, with spaces between them. For instance,

```
DELETE c.doc c.wks d.doc
```

would remove c.doc, c.wks, and d.doc from your disk with a single command. The batch file checks to see whether the files you specified are on your disk, tells you if they're not, and erases them if they are. It uses SHIFT to juggle the specified filenames into the single %1 replaceable parameter, and an IF! %1==! test to see if it's finished.

Andrew N. Schwartz
St. Louis, Missouri

This does save typing, but it's probably better to give the batch file another name, such as WIPEOUT.BAT. This is because while DOS lets you use either ERASE or DEL to get rid of files, BASICA uses the all-too-similar DELETE to erase lines, and you can go batty trying to keep them all straight. You don't want any confusion when deleting files.

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■ USER-TO-USER

VALUE ADDED

I've encountered a problem with BASICA.COM's VAL function. Depending on one's philosophy, it is either a bug or a documentation problem.

In the IBM BASICA documentation for VAL, the example at the bottom of the page correctly extracts the house number from an address:

```
PRINT VAL("3408 SHERWOOD BLVD.")
 3408
```

However, if the address happens to be "3408 E 9th Street," VAL returns the number 3048000000000, as it interprets the "E" as the exponential part of the number. This also occurs with a D.

This problem makes VAL useless to perform any kind of number extraction where there is the remotest possibility that a D or E will appear after a number in a string.

■ The VAL function has either a bug or a documentation problem.

Thomas W. Story
Livermore, California

This is an unfortunate problem. However, you can prevent trouble by putting periods after the E or D.

```
PRINT VAL("3408 E 9th Street")
```

will create the mess above, while

```
PRINT VAL("3408 E. 9th Street")
```

won't.

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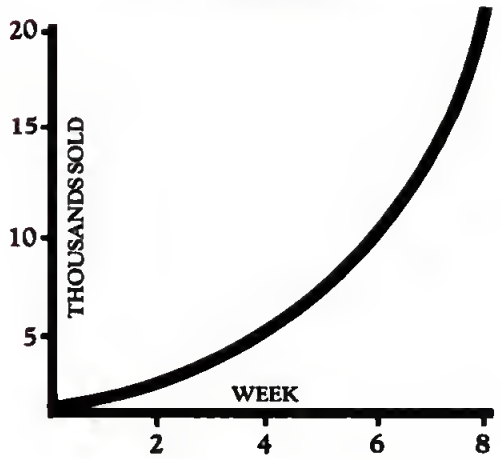

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■ EDITED BY CHARLES PETZOLD

PC TUTOR

In this issue the PC Tutor answers questions about memory boards, ASSIGN and COPY anomalies, and mysterious DOS error messages.

OLD BOARDS IN NEW ATs

Some people where I work who are not very experienced with personal computers wanted to put an old 384K memory board designed for a PC or XT into a PC AT. I told them it wouldn't work. I told them why it wouldn't work. I bet money that it wouldn't work. They installed it anyway, and it worked!

I'm supposed to be the PC expert around here, and now I feel really stupid. I'm too embarrassed to have my name printed. But how come it works?

(Name Withheld)
Boston, Massachusetts

Don't feel bad. From almost everything I had read about the PC AT, I too would have bet money on your side. The 8088 microprocessor in the PC and XT accesses memory in 8-bit bytes; the 80286 microprocessor in the PC AT accesses memory in 16-bit words. Memory access in these two machines is obviously quite different.

But let's take a closer look. The PC and XT expansion board bus connectors carry 62 signals, including the 20 address lines that allow the 8088 microprocessor to access 1 megabyte of memory and the 8 bidirectional data lines. The PC AT has eight expansion board slots. Six of these have a second bus connector that carries 36 signals, including 4 additional address lines (for a total 16-megabyte memory space) and 8 more bidirectional data lines (because the 80286 accesses data in words rather than bytes).

The 62-signal connector on the PC AT is highly compatible with that on the PC and XT. The two AT expansion board slots that have only the old 62-signal connector are designed for older boards with byte-accessible memory and I/O. Existing video cards work in these slots, for instance. However, the 62-signal connectors on the other six slots are wired exactly the same as these two.

The trick is this: The 36-signal bus connector on the AT has two signals called MEM CS16 and I/O CS16. These signals must be generated by any AT board that can handle 16-bit memory or I/O transfers. If these signals are not present—and they won't be if the board doesn't use this second connector—the AT will access memory (or I/O) with 8-bit transfers.

This means the PC AT can handle old memory boards. But you'll pay a significant speed penalty when you use programs that run or use data in this memory space. It's just not worthwhile to spend the money for a PC AT and then slow it down by inhibiting the 16-bit memory transfers that constitute one of the major speed advantages of the 80286 over the 8088.

■ The PC AT can handle old memory boards. But you'll pay a significant speed penalty when you use programs in this memory space.

So, while you didn't know it, you actually won your bet. While it may initially have seemed that the old memory board worked fine in the AT, you'll find that in terms of speed it really performs terribly. To me, that's the equivalent of not working at all.

A PC TYPEWRITER

Can I make my PC act like a typewriter, that is, type straight through from the keyboard to the printer without creating a file?

Steve Hopkins
Franklin, Massachusetts

The easiest way to do this is with the command

```
COPY CON PRN
```

Although the COPY command is generally used for files, it can also copy between devices. "CON" means console and refers to both the keyboard and screen. It will be the keyboard in this case since that's where you're copying from. "PRN" is your printer. After you enter this command, you can start typing. Press Enter after each line you type. If you make a mistake on a line, you can use the Backspace or Left Arrow key to correct it, but after you hit Enter, you're stuck with the line (which is why it's better to use a word processor).

The text won't appear on the printer until you're done. To finish, press the F6 key (or Ctrl-Z) and press Enter. This is an

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■ PC TUTOR

"End of File" signal for the COPY command. The text will then be printed. If you type a Ctrl-L before the Ctrl-Z, you'll get a formfeed after the text is printed.

COPYING FILES TO THEMSELVES

I have recently encountered a problem that I believe isn't documented but should be. I had invoked the command

```
ASSIGN A=C
```

Later, I unthinkingly tried to copy a hard disk file to a floppy disk, using the command

```
COPY C:filename A:
```

Unfortunately, COPY went ahead and tried to copy the file on top of itself. This wouldn't have been so bad, except that the file was originally about 120K, and after I got a message saying "File allocation table error," the file ended up 64K long.

Shouldn't I have been stopped first thing with the message "File cannot be copied onto itself," instead of ending up with a destroyed file?

Larry Brodahl
Omaha, Nebraska

Sometimes we expect DOS to be a lot smarter than it actually is, but I'm not surprised that ASSIGN and COPY collided in this case. The ASSIGN program included with PC-DOS is bad news.

ASSIGN is a remain-resident program that intercepts most DOS file calls and simply swaps disk drive letters. It was included with DOS 2.0 (and later) to deal with those dumb pre-XT programs that assumed every PC has only drives A: and B: and nothing more. All of the PC-DOS manuals include warnings about using ASSIGN.

If you must use ASSIGN with certain programs, then don't issue the ASSIGN commands indiscriminately. Put them in a batch file like this:

```
ASSIGN A=C B=C
{program that can't use drive C:}
ASSIGN
```

The last ASSIGN undoes all the ASSIGNments so you won't accidently do something like your fatal attempt to use the COPY command.

COPY will usually detect when you are trying to copy a file to itself. For instance, if you have a file called MYFILE and you enter

```
COPY MYFILE MYFILE
```

it will tell you it can't do it. But COPY can be fooled. If MYFILE is located in the root directory and you enter

```
COPY MYFILE \MYFILE
```

COPY doesn't realize these are the same file. Obviously, COPY is only doing a simple string compare to determine if you're trying to copy a file to itself. This will always be a problem whenever your file is larger than 64K.

Here's what happens in that case: COPY will open the first file for reading. It will read 64K of the file into memory (less, if 64K is not available). It then tells DOS to create the second file. If the second file already exists (as it does in this case), the file gets truncated to 0 bytes and the space in the file allocation table is freed up. Then COPY writes the 64K buffer to the second file. At this point, COPY goes back to read the next chunk of the first file. However, when DOS now takes a look at the file allocation table for the first file, it finds that all the clusters have been unassigned. It says, "Hey, what happened?" Hence the message you got.

■ I'm not surprised that ASSIGN and COPY collided. The ASSIGN program included with PC DOS is bad news.

Sometimes we learn things about DOS in painful ways, but I hope this discussion can help other readers avoid what happened to you.

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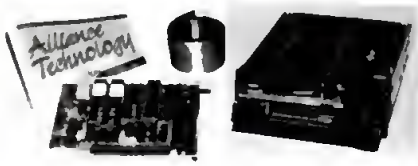

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■ PC TUTOR

Non-System disk or disk error.
Replace and strike any key when ready.

Insert disk with COMMAND.COM and strike any key when ready.

Insert disk with batch file and press any key when ready.

I can't figure out why I get three different messages. You would think that the same message would always come up. I can deal with the first message OK, but even though I follow the instructions for the second and third, the same message keeps coming up and I usually have to reboot. Is there a way to avoid this?

Raymond O. Templin
Jericho, New York

The first message occurs when the PC is booting and the disk in drive A: does not have a copy of the operating system on it. That's the easy one, as you noted: If you can use your machine, you know what disks you can boot from. If you get the first message after you run a program, it means the program is terminating by rebooting.

Let me explain what the second message is all about. COMMAND.COM is the command processor part of DOS. COMMAND.COM is the program that displays the DOS prompt, reads in what you type, executes the internal commands (such as DIR and TYPE), and loads in external programs.

The portion of COMMAND.COM that includes all the internal commands is not needed while another program is running. So, in order to give other programs as much memory as possible, COMMAND.COM initially loads into memory in two pieces. The "resident" part is small and is located in a low area in memory. The "transient" part, which does all the internal commands and batch file interpretation, is located very high in memory. In this way, if a program needs the memory, it can simply write over the transient part of COMMAND.COM. (Compiled BASIC programs almost always write over it.) After the program terminates, the resident part of COMMAND.COM receives control and checks to see if the transient part is still valid (i.e., unaltered). If not, it will reload it. If it can't find COMMAND.COM on the disk, however, you get the message.

Usually, the transient part of COMMAND.COM will look for COMMAND.COM on the disk from which it was originally loaded. For a two-floppy system, this will be drive A:. You can change this default, however, if it will later be more convenient to keep COMMAND.COM somewhere else. Under DOS 3.0 and 3.1, you can tell DOS to look for COMMAND.COM elsewhere by changing the COMSPEC variable in the environment string. If you have a RAMdisk as drive C:, for example, you can enter

```
COPY COMMAND.COM C:
SET COMSPEC=C:\COMMAND.COM
```

This procedure won't work under DOS 2.x, however. For these older DOS versions you must instead load a secondary copy of COMMAND and specify the search path as a parameter, thus:

```
COPY COMMAND.COM C:
COMMAND C:\COMMAND.COM
```

The third message means that the program was invoked from a batch file and COMMAND.COM needs the rest of the batch file to continue. What's annoying is that you'll get this message even if the batch file has just executed its last line. Fortunately, this message is the easiest to handle. Just hit Ctrl-Break. You'll be asked if you want to terminate the batch file. Answer with a Y.

■ In order to give other programs as much memory as possible, COMMAND.COM initially loads into memory in two pieces.

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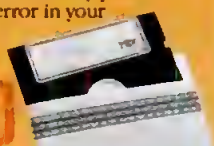

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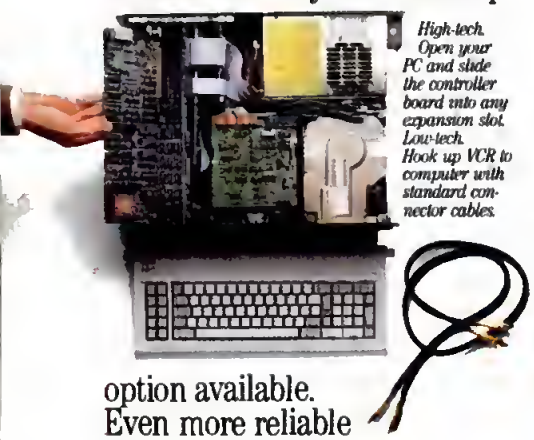

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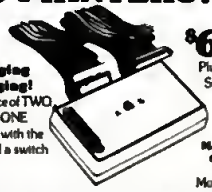

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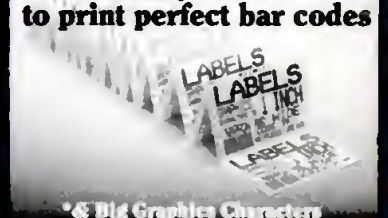

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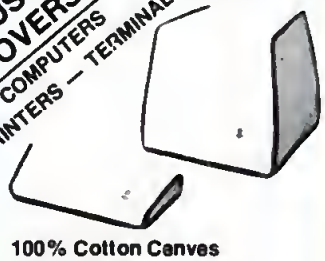

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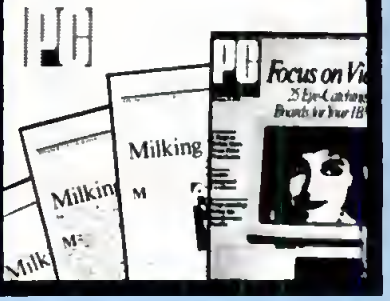

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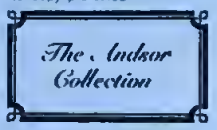

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CIRCLE 109 ON READER SERVICE CARD

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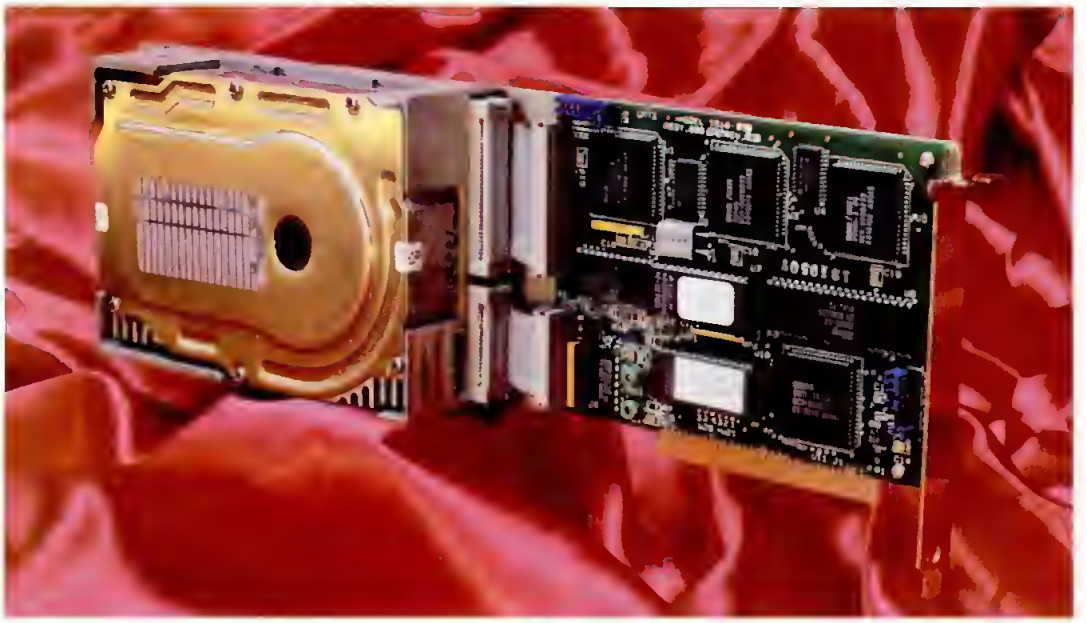

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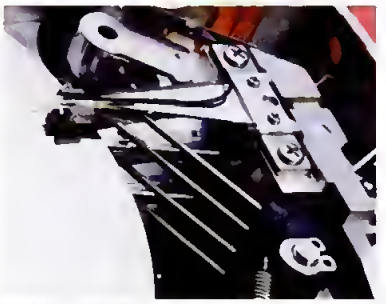

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CIRCLE 509 ON READER SERVICE CARD

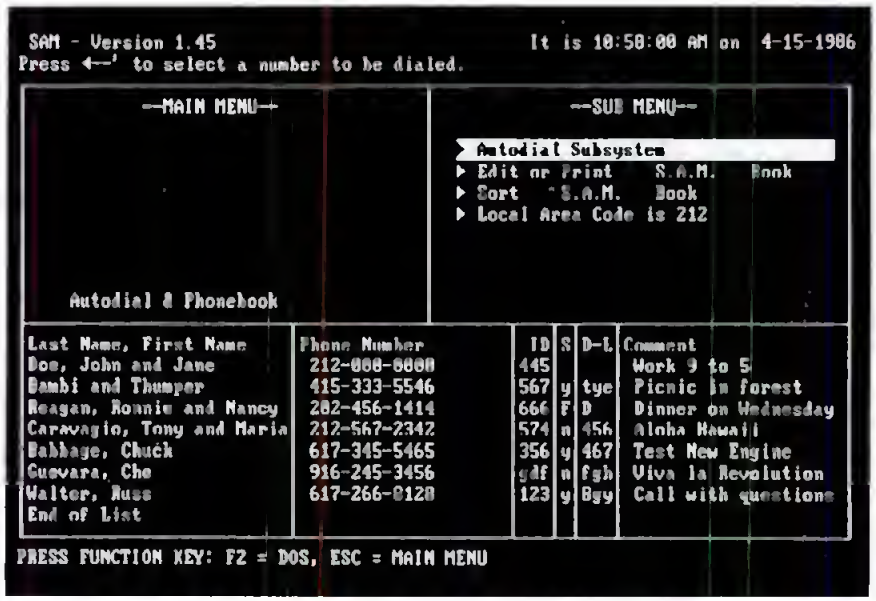
PC MAGAZINE REVIEWS IN BRIEF

The Smart Answering Machine: SAM Plays It Again

BY CHRISTOPHER JOHNSTON

How smart is the Smart Answering Machine (SAM) from Dialectron Inc.? Given that it costs a mere $295, receives and time-stamps messages, can be programmed to call up one or more people, delivers a message and waits for a response, and allows separate messages for different recipients, I'd say it's a lot of brain for the bucks.

The features that take SAM beyond average phone management are the software-driven dial facilities. With its menued, *SideKick*-like dialer, SAM can dial up to 999 numbers (more could be read in from a separate file), deliver the same message, and wait for a response. Listeners can hear personalized messages after inputting a personal three-digit code. One step above that, privileged users could input another code, and so forth. This tree structure will be particularly useful to telemarketing, phone canvassing, and personal communications (and becomes more personal as you move up the tree).



SAM's menued, SideKick*-like dialer can accommodate up to 999 entries and can sort by name or phone number. It can also read in ASCII-format lists. The access IDs can be listed either in number format or as letters that correspond to digits on a telephone number pad.*

RELIEF FROM LONG MEETINGS: THE PERFECT EXCUSE SAM is time sensitive, so these messages can be delivered after you've gone to work or 5 years from now. This feature might come in handy if you're due at a meeting you know will drag on much longer than necessary. Have SAM call you at a certain time and ask that you be called to the phone "for an important message." SAM will continue to wait until you punch in the three-digit code asking it to play back the message. When you're finished, simply rush back into the meeting and explain something's come up and you have to leave.

Receiving messages in a SAM-equipped office is also no problem. When SAM receives a message, it can either forward it to another number, wait for you to check in remotely, or store it until you get home. If you're at home and you're in the mood to talk with only a few select callers, SAM will beep you when somebody you really do want to talk to is on the line.

EASY CONNECTIONS Cramming an answering machine into a microcomputer isn't the engineering trick it might seem. SAM is an internal half-card that fits into any empty expansion slot and does its interaction out the back of the bus through two RJ-11 phone connectors: one connects to any standard telephone and the other connects to the telephone jack. When SAM or your PC is turned off, your telephone works as usual. Driven by SAM's software, the board digitizes and compresses speech onto disk. Playing back messages is a matter of putting the telephone receiver to your ear and hitting the Return key.

HARD DISK RECOMMENDED SAM comes with the choice of high or low compression and records at approximately 11K bytes per second, then compresses that speech down to a third that size. Dialectron recommends a hard disk. A dual-floppy PC holds about 4 minutes of pure speech. When one floppy is full, SAM automatically switches to the second. Sound quality on SAM is good but a little raspy.

SAM's biggest problem is that unless you're using some kind of multitasking system, you can't use your PC for anything else when SAM is playing receptionist. Dialectron shrewdly notes that most people have their answering machines turned on only when they're not available or free to talk.

PC MAGAZINE FACT FILE

Smart Answering Machine (SAM)
Dialectron Inc.
2035 California St., #t7
Mountain View, CA 94040
(415) 960-3040
List Price: $295; Optional Programmer's Toolbox, $129
Requires: PC or compatible, 256K RAM, dual disk drive, DOS t.i or later.
In Short: A half-card telephone-answering machine with RJ-11 jacks, telephone lines, and software card.

CIRCLE 601 ON READER SERVICE CARD

PRICED TO SELL Sam's big benefit is its price tag. At $295, it costs more than most answering machines, but that's small change for a hardware/software gizmo as complex as SAM. Since the price and features are right, Dialectron might find itself selling to both small companies and home consumers as well as larger corporations outfitting employee PCs.

Although getting a SAM is no problem now, it might soon become easier—as easy as strolling down to your local Radio Shack. Recent speculation has it that Dialectron and Tandy may sign a distribution agreement for the product.

There are more-advanced telephone management systems on the market, but for meeting the practical needs of telecommunications enthusiasts and price-conscious businesspeople, SAM beats out its higher-priced but more full-featured competition. PC

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Cauzin SoftStrips: The Paper Chase, Continued

BY ROBIN RASKIN

Just when you thought you were finally within sight of the paperless office, Cauzin Systems enters the scene. Backed by the likes of Kodak, Xerox, and General Instrument Corp., Cauzin has developed a product called SoftStrip, which encodes and reads data using nothing less than the nemesis of the paperless office: plain old paper.

The encoding part of the process prints software data, graphics, or sound impulses onto plain paper in highly condensed optical binary patterns. To decode the paper data strips, you need the Cauzin SoftStrip Reader. The Reader is a device that plugs into the PC's serial port and reads data from the paper strips using optical electronic scan technology, much as a bar-code reader works. The Reader comes packaged with RAM-resident communications software, a cable, and sample SoftStrip programs.

EASY PRINTING Cauzin offers a service for printing your software and data onto little paper strips; however, since the cost varies greatly depending on the job, it is best to call the company for an estimate.

Cauzin also makes available StripWare—software you can use to print your own data strips. The process can be accomplished on virtually any type of printer and on virtually any type of paper, albeit at a lesser density than with the more sophisticated and costlier method that Cauzin offers.

PC MAGAZINE FACT FILE

Cauzin SoftStrip
Cauzin Systems Inc.
835 S. Main St.
Waterbury, CT 06706
(203) 573-0150
List Price: SoftStrip Reader, $199.95; software for printing out strips on laser printers, $19.95; StripWare, from $3 to $13.
Requires: Serial port.
In Short: Recycled bar-code technology with an uncertain commercial future. Works fine, but will probably be useful only for highly specialized applications.

CIRCLE 590 ON READER SERVICE CARD

The $199.95 Cauzin SoftStrip Reader reads programs encoded on strips of paper.

The SoftStrip Reader scans, decodes, and inputs a 5,500-byte data strip in approximately 30 seconds. PC Magazine Labs found that you can crumple the strips, draw on them, spill stuff on them, and still run them accurately through the Reader.

REVOLUTIONARY TECHNOLOGY? Cauzin spokespeople view SoftStrip technology as more than a computer peripheral. "It's a brand-new communications and publishing technology," says Brandon Nordin of Cauzin. "Initial response from computer dealers has been good, but it's too early to spot marketing trends."

There's no doubt that SoftStrip technology works; the question is, for whom? SoftStrip may be yet another "gee whiz" technology with uncertain commercial potential. The marketing problem is familiar. Users won't buy SoftStrip Readers until there are enough SoftStrip programs and data to justify the purchase. Software entrepreneurs won't develop SoftStrip programs until the commercial demand exists.

Cauzin's SoftStrip reduces the cost of distributing data or software but not necessarily of obtaining data, since the Reader costs the same as a floppy disk drive and not much less than modems, which are already in widespread use. PC

SOS and 123 AutoSave: In Search of the Indelible Spreadsheet

BY CHRISTOPHER BARR

How many times have you lost important data while working with Lotus's *1-2-3?* If you are like most of us, probably enough to make you lose your temper. Don't get mad, get *123 AutoSave* or Goldata's *SAVE OUR SPREADSHEET (SOS).* These memory-resident utilities help protect you from power outages and mysterious PC freeze-ups by automatically backing up

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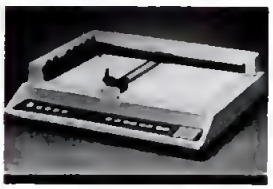

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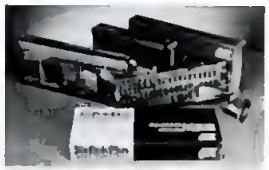

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1-2-3 spreadsheets as you work.

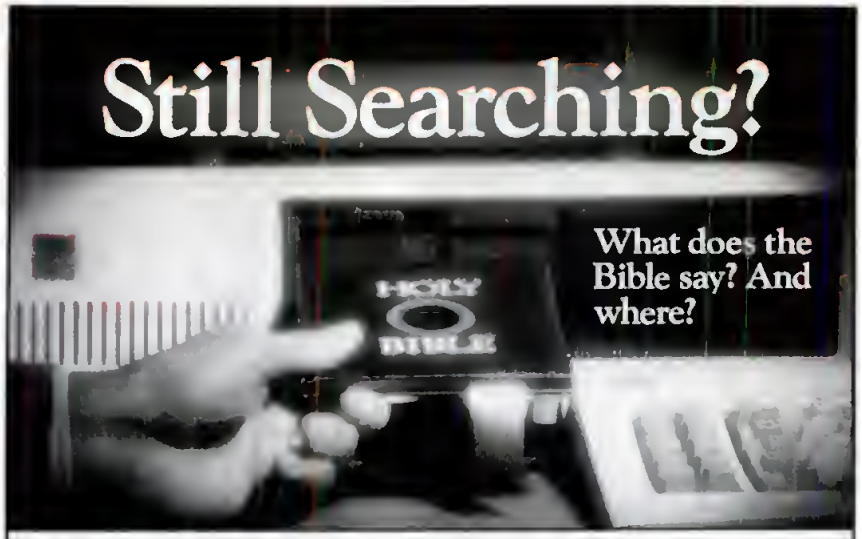
123 AutoSave is easy to use. It can be installed directly onto the *1-2-3* system disk or into the Lotus directory on your hard disk and will be loaded automatically each time you boot up *1-2-3*. The program comes preset to back up every 10 minutes, but you may select anywhere from 1 to 60 minutes, and you are able to change save intervals from within *1-2-3*. In *1-2-3*, when you are in the ready mode, the flashing "wait" sign will alert you that *123 AutoSave* has taken over and is backing up the worksheet. It creates a file named 123-SAVE.WK1 (*1-2-3*, Release 2) or 123-SAVE.WKS (Release 1A) and stores it in the directory you are logged on to.

SAVE OUR SPREADSHEET *SOS* is similar to *123 AutoSave* but for now works only with *1-2-3*, Release 1A. It must be loaded before each session and remains resident until you reboot or turn the PC off. You may select backup increments between 30 and 3,600 seconds (1 hour); *SOS* comes preset for every 2 minutes. Unlike *123 AutoSave*, *SOS* lets you change the save interval only during installation. Like *123 AutoSave*, it creates a temporary file (SOS.WKS) and stores it in the current directory. Both programs may be disabled and enabled at any time. Remember: neither of these programs are a substitute for saving manually, though, since both save all worksheets under the same name. PC

PC MAGAZINE FACT FILE

123 AutoSave
Megahertz Corp.
50 S. Main St., #600
Salt Lake City, UT 84144
(801) 355-8857
List Price: $49.95
Requires: *1-2-3*, Release 1A or 2; DOS 2.0 or later.
In Short: A RAM-resident utility that automatically backs up the spreadsheet currently in RAM, at a predetermined interval. Not copy protected.
CIRCLE 549 ON READER SERVICE CARD

***SAVE OUR SPREADSHEET (SOS),* Version 1.0**
Goldata Computer Services
2 Bryn Mawr Ave.
Bryn Mawr, PA 19010
(215) 525-1036
List Price: $29.95 plus shipping
Requires: *1-2-3*, Release 1A.
In Short: *SOS* is a memory-resident program that will back up a spreadsheet as you work. Not copy protected.
CIRCLE 548 ON READER SERVICE CARD



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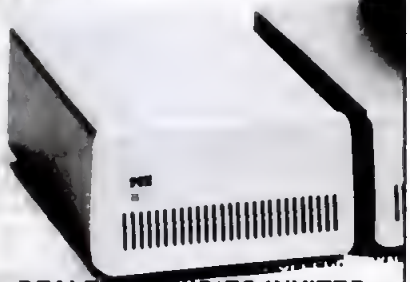

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PC MAGAZINE

COMING UP

ENHANCED GRAPHICS ADAPTERS For a while, the IBM Enhanced Graphics Adapter—known for its high resolution and high price—was the only choice for PC users who wanted better resolution in color. But thanks to market demand and an innovative chip set from a new company called Chips and Technologies, the picture has changed. Today, nearly a dozen alternatives are available. Stewart Alsop discusses the growth of the EGA marketplace. Charles Petzold reviews the IBM EGA and 11 compatible boards and PC Magazine Labs reports benchmark test results for the 12.

BUILD YOUR OWN AT Building an AT, either from a packaged kit or from scratch, takes little time and offers both customization and superb performance for the price. Robin Raskin, who assembled one AT from a PC Designs kit and one from separately purchased components, describes her foray into computer construction and reports on how the clones score on the PC Magazine Labs benchmark tests.

PROJECT DATABASE Project Database II comes to a close with the last of three installments. In this issue, *PC Magazine* reviews 18 more flat-file database management systems.

BUSINESS FORECASTING The power of statistical techniques for predicting the business future is now accessible to all PC users, not just statisticians working on mainframes. Marvin Bryan reviews 16 packages that cover a wide range of functions for general and specific needs. Some, targeted specifically at statistics novices, feature easy menu interfaces and helpful tutorials.

BACKING IT UP Vincent Puglia continues his series on hard disk utility software with reviews of 11 software packages dedicated to making it easier and faster to back up your hard disk to floppies.

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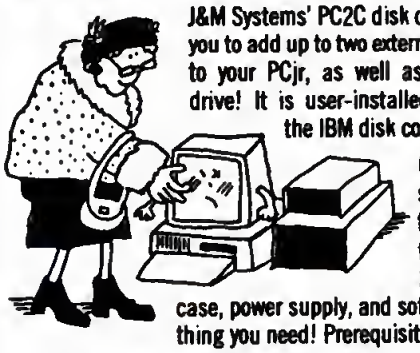

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1 Park Avenue, New York, NY 10016 (212) 503-5100

MA, NH, VT, ME, RI, CT
District Manager
160 State Street
Boston, MA 02109
(617)367-7190
John Bucknavage - Account Representative
(212)503-5100

DE, MD, DC, VA, WV, NC, SC, AL, MS, TN, AR, KY, PA, GA
Bonnie Breslauer - District Manager
5901 Peachtree Dunwoody Road—Suite 500
Atlanta, GA 30328
(404)394-0590
Lauren Morse - Account Representative
(212)503-5100

NY, NJ, PA
Janet Ryan - District Manager
(212) 503-5307
Ken Hom - Account Representative
1 Park Avenue
New York, NY 10016
(212)503-5128

NE, WI, IL, IN, MN, MO, OH, MI, IA, ND, SD, Canada
John Hemsath - District Manager
180 N. Michigan Avenue Suite 1400
Chicago, IL 60601
(312)346-2600
Jim Stafford - Account Representative
(212)503-5100
Jeff Miller - Western Advertising Director

CA (San Francisco & North), OR, WA
Dave Riegler - District Manager
11 Davis Drive
Belmont, CA 94002
(415)598-2341
Lauren Morse - Account Representative
(212)503-5100

CA (Santa Barbara to So. San Francisco), CO, ID, MT, AK, NV, HI
Gini Talmadge - District Manager
Charisse Smith - Account Representative
1 Park Avenue
New York, NY 10016
(212)503-5100

CA (LA, San Diego & Orange County), AZ
Debra Huisken - District Manager
1601 Dove Street Suite 240
Newport Beach, CA 92660
(714)476-0749
Steve Lincoln - Account Representative
3460 Wilshire Blvd.
Los Angeles, CA 90010
(213)387-2100

TX, OK, LA, KS, UT, NM
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